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STEEL

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Contents

Volume 104—No. 13 **March 27, 1939**

READER COMMENTS 9
AS THE EDITOR VIEWS THE NEWS 13
NEWS
- First Quarter Gains 50 Per Cent; Foundation for Further Rise 15
- Early Opening of Iron Ore Season, with Double Last Year's Tonnage 16
- Financial News of Steel Industry 17
- February Steel Exports Steady 18
- Capacity Center for Sheets, Strip 19
- Steelworks Operations for Week 19
- Pays Tribute to Scrap Collector 20
- Labor News 21
- Men of Industry 22
- Obituaries 23
- Aviation 27
- Activities of Steel Users and Makers 32
- Meetings 33

WINDOWS OF WASHINGTON 24
MIRRORS OF MOTORDOM 29
EDITORIAL—Unemployment and the Machine—and Profit 34
THE BUSINESS TREND
- Activity Index Reflects Seasonal Improvement 35
- Charts and Statistics 35-37

FORUM ON RE-EMPLOYMENT 38
TECHNICAL
- Pride in Craftsmanship Is Powerful Factor in Tool Engineering 40
- Prize Packages 42
- Gas-Filled Cable Is Developed 58
- Choice of Cutting Tools Rests in Maintenance vs. Production Costs 66
- Reinforces Roads with Steel Binder 76

PROGRESS IN STEELMAKING
- Adds 44-Inch Blooming Mill 43

METAL FINISHING
- Base Metal Coloring—Part 11 46

MATERIALS HANDLING
- Barge Assembly 51

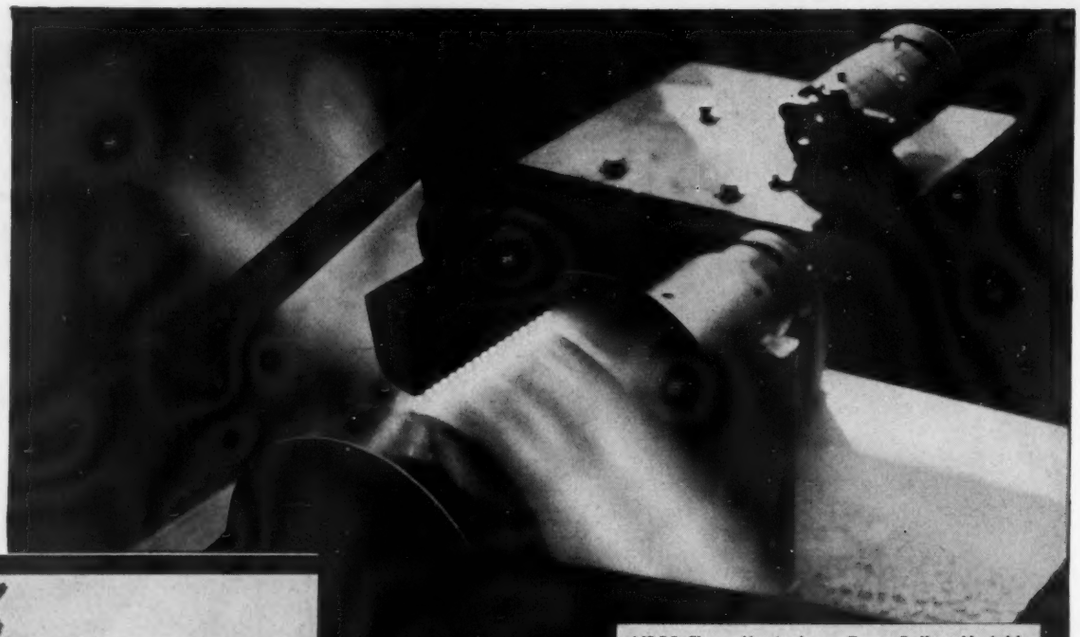
STAMPING
- Hardware Specialties 54

JOINING AND WELDING
- Power Supply 62

INDUSTRIAL EQUIPMENT 68
NEW METAL PRODUCTS 74
MARKET REPORTS AND PRICES 77
- The Market Week 78

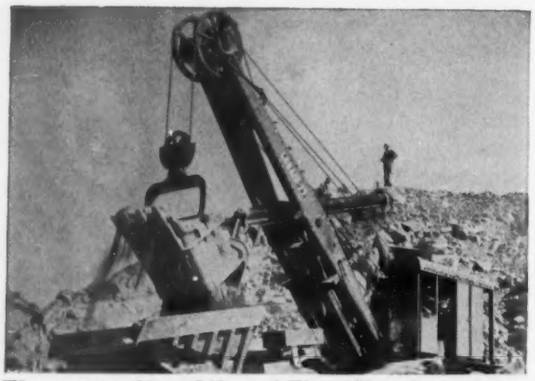
BEHIND THE SCENES 90
CONSTRUCTION AND ENTERPRISE 98
INDEX TO ADVERTISERS 104

PRODUCTION • PROCESSING • DISTRIBUTION • USE



AIRCO Flame Hardening a Taper Roller. Variable speed motor with speed reducer provides the correct peripheral speeds. Photo courtesy, Thew Shovel Company, Lorain, Ohio.

now 28 ~~27~~ parts of Thew Power Shovels are AIRCO FLAME HARDENED!



The outstanding ability of Thew Shovels to stand up on jobs like this is convincing proof of the effectiveness of AIRCO FLAME HARDENING.

IN 1936 the Thew Shovel Co. with the cooperation of AIRCO Field Service Engineers, made the first application of flame hardening to power shovel parts.

Results were so satisfactory that the process has since been applied to a long list of parts including spur and bevel gears, roller pads, brackets, brake bands, spindles, clutch jaws, etc.

Latest addition to the list are the taper rollers which carry the swinging parts of the shovel. In applying flame hardening to these rollers a set-up had to be devised that would give the right peripheral speed for the different diameters. Cooperation of AIRCO Field Service Engineers was again invited—and the problem was readily solved with AIRCO Flame Hardening Equipment.

AIRCO OXYACETYLENE FLAME HARDENING is no longer on trial. The experience of the Thew Shovel Co., and many other manufacturers, has definitely shown that it not only produces better hardening results, but also cuts down costs. If hardening plays a part in your manufacturing, it will pay you to investigate. AIRCO, pioneer in developing the process and necessary equipment, will be glad to give you full details. As a first step, write for the FLAME HARDENING BULLETIN.

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As the Editor Views the News

■ CURRENT indications are that the 1939 volume of business will be even better than anticipated at the start of the year. STEEL'S review (p. 15) reveals that business in the first quarter has been at least 50 per cent better than in the comparable period of last year, and in some departments the improvement has been even more pronounced. Demand is swelling in many different directions, promising further expansion in the months to come. STEEL'S index of industrial activity has registered another gain (p. 35) and now stands at 93.3. Rail freight movement in the Great Lakes region in the second quarter (p. 16) is expected to be 41 per cent above that in last year's second quarter. . . . Annual reports to employes (p. 21) are increasingly utilized by management in its industrial relations.

• • •

Research work continues to lead to increased employment. Johns-Manville Corp. (p. 21) points out that 40 per cent of employment in its plant today is based on sales of products developed in the past ten years. Toledo Scale Co. cites two new industries (p. 17) that have developed from its research work. . . .

Research Helps

Lake ore fleet operators will commission more vessels and start the season earlier this year (p. 16) to accommodate an anticipated 100 per cent increase in lake ore shipments. It is expected that 40,000,000 tons will be moved this year as compared with 19,263,000 tons in 1938. . . . Republic Steel Corp. is starting work on an extensive program of expansion in its capacity for producing (p. 17) stainless steel and cold-rolled carbon strip steel.

• • •

There continues every indication that the federal tax system will not be overhauled this year (p. 24) in accordance with the wishes of industry. There is little likelihood that government expenditures will be lowered. The senate committee on education and labor will vote March 28 to determine whether amendments to the Wagner act will be taken up at this session. A subcommittee (p. 26) will hold hearings on proposed amendments to the Walsh-Healey act which would make it still more onerous to government contractors. White collar employes and workers who have a guaranteed monthly income may be exempted from the provisions of the wages-hours law. . . . Newly developed is an automatic synchronizer (p. 27) to eliminate the disturbing "beat" from unsynchronized engines in multi-motored airplanes.

Vote March 28

• • •

This week's contributor to STEEL'S Forum on Re-Employment (p. 36) is Henry Buker, vice president, Brown & Sharpe Mfg. Co., Providence, R. I. Industry is accustomed to meeting competition and if government is proving a deterrent to re-employment this problem can be solved by using the same methods that have enabled industry to survive in the past. The way out is through good advertising and salesmanship. . . . In commenting on the recent exposition and convention of the American Society of Tool Engineers, Guy Hubbard (p. 40) finds that pride in craftsmanship continues to animate the technicians in this field; where the craftsmen of old served only a fortunate few, those of today serve the entire population. . . . Choice of cutting tools (p. 66) rests in maintenance vs. production costs.

Pride in Craft

• • •

Unusual continuous production line (p. 51) is designed to handle steel fabrications weighing up to 750 tons. Dravo Corp., Pittsburgh, uses it for the manufacture and launching of steel barges and other floating equipment. . . . Interesting features mark the new 44-inch blooming mill (p. 43) of the Steel Co. of Canada. . . . A manufacturer of shelf brackets, door hinges and other hardware items finds that the stamping process (p. 54) is best for forming such products; it utilizes methods which keep waste material at minimum. . . . Much has been learned about coloring metals by heat, chemical reactions and plating treatments; by such methods (p. 46) color finishes may be obtained in wide variety. . . . The problem of supplying power to large resistance welders (p. 62) is a simple one.

Handling Steel

E C Kreutzberg

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First Quarter Shows 50% Gains, Good Foundation for Further Improvement

■ FIRST quarter business has presented an encouraging pattern in the steel industry, bettered in recent years only by the period in 1937. Compared with first quarter 1938, the composite picture is nearly 50 per cent improved, and in some departments more.

Starting with a sharp rise the first week in January, when the holiday decline was overcome, advance has been steady, though slow, with few backward steps. The consistent gain indicates a firm foundation.

A rising curve is characteristic of first quarter business, but this year it is devoid of important advances or recessions that have interrupted orderly progress in previous years. It follows closely the curve of 1936, precursor to the best year the industry has seen since 1929. In 1936 the steel industry started at about 40 per cent of capacity and progressed with unusual steadiness to about 80 per cent at year's end.

This was in marked contrast to 1937, with its abrupt drop in the final quarter, and 1938, with its hesitating first half and rapid rise in second half.

Important factors in the steel market show a fairly parallel course for the first quarter.

Auto Production Gaining

Automobile output for the period is conservatively estimated at 1,039,000 units, an increase of 54 per cent over the 668,317 assembled in the corresponding months in 1938. It is slightly better than 1,013,000 for fourth quarter, 1938, when new model introduction tended to increase buying. These two quarters produce more than half the cars in a model year and second and third quarters probably will show a smaller production, though the automotive industry believes the full model year will yield an increase of about 25 per cent over the 1938 model year.

Railroads are providing an unexpected tonnage of steel, the total running far ahead of first quarter, 1938. Freight car buying started in September and has continued steadily; considerable inquiries still pend. While only 814 freight cars were placed during first quarter, 1938, awards since Jan. 1 total more than 2700, a gain of 230 per cent. Compared with fourth quarter the record is not so bright, 7050 cars being ordered in that period. However, from the standpoint of the steel mill, material for the latter cars has been coming out for rolling during the present quarter.

Rail Buying Increased 250%

Since Jan. 1 American roads have placed contracts for more than 400,000 tons of rails, compared with 112,150 tons in the initial quarter last year, 250 per cent increase. Considerable rail tonnage is under consideration, purchase delayed by financing difficulties or slow procedure in gaining court permission by roads in receivership.

Locomotive buying, outlet for considerable steel, totaled 86 units this quarter, against 55 in the corresponding period last year, an increase of 56 per cent. Twenty-one of the 86 are diesel electric locomotives.

Structural steel has contributed importantly to the general increase in steel demand, first quarter placements being estimated from STEEL'S weekly compilations at 308,000 tons, compared with 202,529 tons in the same period of 1938, a gain of 52 per cent. Demand for steel bars for concrete reinforcing also has been stronger, estimated buying for the first quarter being 146,000 tons, compared with 69,498 tons a year ago.

American Institute of Steel Construction reported for January, its latest release, bookings by fabricators of 101,559 tons, compared with 80,320 tons for January, 1938. At the same time tonnage on books for future fabrication totaled 479,554 tons, against 338,119 tons at the

Cleveland Bridge First "Laid Down" in Detroit

■ To test accuracy and save time on the site, sections for the 2520-foot Main street bridge over the Cuyahoga river, Cleveland, are test-assembled at the R. C. Mahon Co. plant in Detroit. Section shown above is 345 feet long, weighs 600 tons. Bridge and approaches will require more than 15,000 tons of structural steel; estimated cost is $6,000,000. Wide World photo

close of the same month last year.

Steelworks operations averaged 52.69 per cent of capacity in January, 54.10 per cent in February, and at about 56.5 per cent in March. This compares with 29.15 per cent in January, 31.74 in February, and 33.85 in March, 1938. Ingot output in the first quarter is estimated at 9,405,516 gross tons, compared with 5,448,896 tons in first quarter, 1938, and 9,833,323 tons in the final quarter last year.

American Steel & Wire Co., Cleveland, in its first crop report for 1939 says, "the agricultural industry is now in a better potential position than it has been for possibly eight years." Large supplies of cotton, wheat, corn, dairy and poultry products can become a boomerang, it points out, if industrial income does not improve rapidly enough to consume them at fair prices to the farmer. Government reports and statistical forecasts indicate that industrial income should improve during 1939.

Bureau of farm economics estimates cash farm income for the first two months this year was $1,105,000,000, only $2,000,000 less than in the corresponding period in 1938.

Shipbuilding is on a much broader scale than a year ago, and as steel for this purpose is spread over a considerable period while construction progresses, a continuing backlog is provided. Vessels under construction Feb. 1 to specifications of the American Bureau of Shipping totaled 177, aggregating 667,980 gross tons, compared with 91 a year before. By March 1 this had increased to 180 vessels, of 697,110 gross tons, the highest total in several years. Steel for these craft will be supplied over the remainder of the year.

Price Stability Beneficial

Steel prices established last July 1 have been continued through the present quarter and for second quarter. This has eliminated tendency to speculative buying.

Composite price for finished steel as compiled by STEEL, has been steady at $56.50, compared with $61.70 a year ago, the reduction occurring last midyear. The iron and steel composite, which contains some scrap items, also has been steady through first quarter at about $36.39, compared with $38.80 a year ago. Steelworks scrap composite has been unusually stable, at a range of $14.77 to $14.96, during first quarter, comparing with $13.20 to $13.85 in first quarter, 1938.

Steadiness of scrap quotations is a constructive influence. Holders believe the next few months will see increased steel production and scrap will be needed in large quantities to meet this anticipated demand.

Looking at the broader field covered by STEEL's index of activity (page 35) it is apparent the current quarter's improvement in steel reflects the general situation. For first three months of 1938 this index averaged approximately 71 and in the present quarter it averages close to 91. In the final quarter of 1938 it averaged 92.

Index of machine tool orders shows an increase of nearly 80 per cent over a year ago, and foundry equipment index about 50 per cent.

Basis for expectation of good business in steel through second quarter is found in accumulated backlogs of steel for shipbuilding, railroads and structural projects, for which specifications will be spread over several months. Added to this is a larger tonnage represented by pending projects in each of these departments and continued requirements for the automotive industry for at least three months.

Seasonal factors contributing to enlarged steel demand are the needs of agricultural implement manufacturers, who will enter their active season soon, and the increase in demand for tin plate as the canning season opens.

Prepare for Early Opening of Iron Ore Season, with Double 1938 Tonnage

■ GREAT LAKES ore fleet operators are preparing to commission more vessels and to start the shipping season earlier than last year, to accommodate an anticipated 100 per cent increase in Lake Superior iron ore shipments.

Consensus in the industry is that 40,000,000 tons of ore will be moved, compared with 19,263,000 tons in 1938. This would mean a 20 per cent increase over average shipments for the past ten years and now is considered a "normal" movement.

Between 200 and 250 ore vessels will be placed in service during the season; maximum last year was 154 in October. Total fleet includes 306 carriers.

Pittsburgh Steamship Co., subsidiary of United States Steel Corp., and largest fleet operator on the lakes, is scheduled to open with 64 of its 79 ships. Last year the company's opening fleet was only 29 vessels.

First carriers will start immediately after April 15—ice conditions at the Sault canals permitting—although many will not start until around the first of May. Ice in Whitefish bay, St. Mary's river and the Straits is reported to be not unusually thick. Interlake navigation last year opened April 13, and in 1937, on April 15.

Estimates of the ore movement are, of course, provisional and depend largely on the degree steelmaking develops. Some authorities believed 40,000,000 tons a conservative estimate and predict the total actually may reach or exceed 45,000,000 tons, or approximately the same as 1936 shipments.

Stocks at lower lake docks and furnaces May 1 will be about 23,000,000 tons on the basis of present stocks and indicated operations. This compares with 33,500,000 tons May 1, 1938, and 14,500,000 tons on May 1, 1937.

Stocks on hand at Lake Erie docks and furnaces March 1 totaled 28,840,053 tons. February consumption was 2,852,540 tons, a slight decrease from the January total, 2,926,706. Average daily consumption in February, however, was higher.

Ore prices for this season have not yet been determined as there have been no inquiries for tonnage. Reaffirmation of last year's prices is considered likely, as ore mining and carrying costs probably will remain constant. On the other hand, steel prices have been reduced. Last change in ore prices was at the opening of the 1937 season when they were advanced 45 cents a ton after being unchanged for eight years.

Further expansion of truck and conveyor haulage systems in open-pit mining is expected, and a number of orders for such equipment already have been placed. Combined with small tractor shovels and scrapers, this system is claimed to be more flexible and less expensive, particularly for small and medium-size mines. In the large pits, trucks and small shovels are playing a more important role in loading railway cars and in clean-up jobs.

SEE 41% INCREASE IN GREAT LAKES CARLOADINGS

Freight car requirements in the Great Lakes regions will be 41 per cent greater in second quarter this year than in comparable period in 1938, estimated the Great Lakes Regional Advisory board, meeting in Cleveland, March 22.

Greatest increase will be in ore

and concentrates, up 169.2 per cent, and automobiles, trucks and parts, up 82.4 per cent. Steel carloadings are estimated to increase 17 per cent. For all commodities the region is expected to use 248,905 cars in the next three months, against 246,522 in the same period last year.

Samuel B. Botsford, executive vice president, Buffalo chamber of commerce, referred to the proposed St. Lawrence waterway project as being impractical in light of present day conditions.

H. C. Carroll, general traffic manager, Goodyear Tire & Rubber Co., Akron, O., was elected president of the board; W. E. Maloney, traffic manager, Buffalo Corn exchange, vice president; F. J. Armstrong, traffic manager, U. S. Radiator Corp., Detroit, chairman of executive committee.

Toledo Scale Co. Begins Work on $500,000 Plant

■ Work has begun on a $500,000 plant for the Toledo Scale Co., Toledo, O. Operations now are spread out in five plants at Toledo; they will be combined in the new unit.

The new plant was designed by Albert Kahn Inc., Detroit, and is being built by the A. Bentley & Sons Co.

Two important Toledo industries have resulted from research and development activities of the scale company. They are the Toledo Porcelain Enamel Products Co. and Plaskon Co. Inc.

Republic To Increase Strip, Stainless Capacity

■ Extensive installation of new equipment and re-arrangement of present equipment in Republic Steel Corp.'s Warren and Massillon, O., plants will result in greatly increasing stainless capacity at Massillon and cold rolled carbon steel strip capacity at Warren. Work will be started immediately, will take some months to complete.

Stainless capacity, with the exception of the hot rolling operations, will be concentrated in Massillon, the hot rolling to be continued in Warren. Three annealing and pickling lines are being moved from Warren to Massillon and three new reversing mills, a 34-inch 4-high, a 28-inch 4-high, and a 20-inch 4-high, with a 2-high skin pass mill are to be installed at Massillon.

Cold rolled carbon strip capacity at Warren will be substantially increased due to the removal of stainless cold rolling to Massillon. In addition to new equipment in the latter city it will be necessary to rebuild a part of present structures.

FINANCIAL

■ GRANITE CITY STEEL CO., St. Louis, reports a net loss of $330,231 for 1938, compared with net profit of $254,225, or 66½ cents a common share, in 1937.

♦

Crucible Steel Co. of America, New York, had a net loss of $2,237,026 in 1938. A net profit of $4,017,931, equal to $5.21 a common share, was reported in 1937.

♦

Wickwire Spencer Steel Co., New York, reports net loss of $597,980 for 1938, compared with a net profit of $592,466 in 1937.

♦

Climax Molybdenum Co. shows a net profit of $7,872,141, equal to $3.12 a share for 1938. In 1937 profit was $7,173,796, $2.85 a share.

DIVIDENDS DECLARED

Laclede Steel Co., St. Louis, quarterly dividend of 15 cents, payable March 31. Like amount was paid on March 31 last year.

Sharon Steel Co., Sharon, Pa., quarterly dividend of $1.25 a share on the $5 preferred stock, payable April 1.

American Shipbuilding Co., Cleveland, 50 cents a share on common stock, payable May 1. Like amount was paid Feb. 1.

U. S. Hoffman Machinery Corp., New York, quarterly dividend of 68¾ cents a share on preferred stock, payable May 1.

Pacific Can Co., San Francisco, 12½ cents a share on common stock, payable March 31.

Independent Pneumatic Tool Co., Chicago, quarterly dividend of 25 cents a share on common stock, payable March 31.

Kalamazoo Stove & Furnace Co., Kalamazoo, Mich., quarterly dividend of 12½ cents a share on capital stock, payable May 1.

Consumers' Net Income Off Sharply

■ TOTAL net income of 125 companies among equipment manufacturers, suppliers and consumers last year aggregated $82,179,926, or 32 per cent of the $256,980,408 net profit reported by the identical companies in 1937. STEEL's tabulation, Feb. 13, page 30, included 25 companies; the tabulation Feb. 27, page 18, included 50, while the subjoined table also lists 50. Thirty-five of the 125 companies recorded a loss last year, while only eight reported a deficit in 1937. In the following table all figures are net income, except where asterisk denotes loss.

	1938	1937
Acme Wire Co., New Haven, Conn.	$ 65,483	$ 301 378
All-Metal Products Co., Wyandotte, Mich.	51,323	97,353
American Airlines Inc., Chicago	213,262	93,627*
American Laundry Machinery Co., Cincinnati	15,618	972,480
American Radiator & Standard Sanitary Corp., New York	424,077*	7,205,511
American Safety Razor Corp., Brooklyn, N. Y.	776,776	1,294,243
American Stamping Co., Cleveland	13,991	74,099
American Stove Co., St. Louis	47,680	1,113,154
American Transformer Co., Newark, N. J.	10,928	39,112
Art Metal Construction Co., Jamestown, N. Y.	637,210	1,217,518
Auburn Automobile Co., Auburn, Ind.	394,401*	3,424,612
Automatic Signal Corp., New York	44,886	26,966
Automotive Gear Works Inc., Richmond, Ind.	12,229*	15,510
Babcock & Wilcox Co., New York	3,089,191	1,804,829
Bendix Aviation Corp., Chicago	156,048	2,255,133
Bridgeport Machine Co., Wichita, Kans.	13,184	529,685
Bucyrus-Erie Co., Milwaukee	677,952	1,892,543
Budd Wheel Co., Philadelphia	460,670*	618,991
Chicago Pneumatic Tool Co., Chicago	769,554	1,476,884
City Auto Stamping Co., Toledo, O.	511*	392,711
Crane Co., Chicago	380,698	9,765,126
Detroit Gasket & Mfg. Co., Detroit	122,710	513,721
Doehler Die-Casting Co., Toledo, O.	53,607	969,285
Eastern Air Lines Inc., New York	354,249*	196,682
Edward G. Budd Mfg. Co., Philadelphia	1,482,442*	1,219,423
E. W. Bliss Co., New York	186,300	821,365
Hercules Motors Corp., Canton, O.	170,312	721,222
Holland Furnace Co., Holland, Mich.	1,233,382	1,421,600
Koppers Co., Pittsburgh	1,159,805	3,374,589
Maytag Co., Newton, Iowa	682,967	2,292,706
Mesta Machine Co., Pittsburgh	2,909,957	4,668,029
National Supply Co., Toledo	1,263,767	7,857,500
Simmons Co., New York	1,644,867	3,314,251
Standard Tube Co., Detroit	147,978*	15,098*
Stewart-Warner Corp., Chicago	294,323*	1,844,176
Studebaker Corp., South Bend, Ind.	1,762,465*	811,874
Sullivan Machinery Co., Michigan City, Ind.	659,047*	287,130
Thompson Products Inc., Cleveland	435,241	905,814
Timken-Detroit Axle Co., Detroit	828,035	1,811,246
Timken Roller Bearing Co., Canton, O.	1,427,903	10,837,366
Union Tank Car Co., Chicago	1,364,714	2,016,412
Union Twist Drill Co., St. Athol, Mass.	228,519	994,402
United Engineering & Foundry Co., Pittsburgh	3,192,619	4,043,644
United Shipyards Inc., New York	1,316,564*	665,441*
U. S. Pipe & Foundry Co., East Burlington, N. J.	1,654,238	2,235,755
U. S. Universal Joints Co., Detroit	40,442	27,279
Warren Tool Corp., Warren, O.	19,925	48,230
Westinghouse Air Brake Co., Wilmerding, Pa.	933,816	6,253,380
Weston Electrical Instrument Co., Newark, N. J.	168,219	422,885
White Sewing Machine Corp., Cleveland	250,245	299,136

February Steel Exports Steady

■ EXPORTS of steel and iron products, excluding scrap, totaled 134,777 gross tons, valued at $9,772,707, in February, a decline of 11 tons in volume and $441,840 in value from January, according to the metals and minerals division, department of commerce. In February, 1938, exports amounted to 203,850 tons, valued at $12,643,356.

For two months this year exports totaled 269,565 tons, valued at $19,987,254, against 433,607 tons valued at $27,601,898 in the corresponding period of 1938.

Japan was the leading export outlet in February, taking 18,149 tons, including 9256 tons of nonalloy and 3332 tons of alloy ingots, and 2998 tons of pig iron. Shipments to the Netherlands, 12,962 tons, included 9997 tons of plates and 1320 tons of tin plate. Brazil was third largest buyer, 12,301 tons, including 2378 tons of nonalloy black sheets and 1910 tons of tin plate. Canada's total purchases were 12,092 tons, of a wide variety of materials.

Scrap exports totaled 224,913 gross tons, compared with 227,884 tons in January, and 256,790 tons in February, 1938. For two months scrap exports aggregated 452,797 tons; in the same period last year the amount was 613,327 tons.

Of the February scrap exports 169,729 tons went to Japan, 24,840 tons to Italy, 6035 tons to the Netherlands, 4039 tons to Mexico, 3827 tons to Poland and Danzig and 3512 tons to Sweden.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Feb. 1939	Jan. 1939	Jan.thru Feb.'39
Pig iron	4,524	6,325	10,849
Ferromanganese and spiegeleisen	9	.....	9
Other ferroalloys	22	103	125
Ingots, blooms, etc.:			
Not containing alloy	10,140	13,366	23,506
Alloy, incl. stainless	3,335	981	4,316
Steel bars, cold fin.	542	1,290	1,832
Bars, iron	54	61	115
Bars, concrete	1,378	2,471	3,849
Other steel bars:			
Not containing alloy	7,039	6,921	113,960
Stainless steel	4	11	15
Alloy, not stainless	1,144	1,352	2,496
Wire rods	360	353	713
Boiler plate	564	1,118	1,682
Other plates, not fab.:			
Not containing alloy	20,324	9,751	30,075
Stainless steel	6	3	9
Alloy, not stainless	70	38	108
Skelp iron or steel	637	742	1,379
Sheets, galv. iron	335	429	764
Sheets, galv. steel	5,433	7,326	12,759
Sheets, "black" steel:			
Not containing alloy	19,886	24,268	44,154
Stainless steel	41	52	93
Alloy, not stainless	31	347	378
Sheets, black iron	577	576	1,153
Strip steel, cold-rolled:			
Not containing alloy	2,212	1,977	4,189
Stainless steel	45	56	101
Alloy, not stainless	31	11	42
Strip steel, hot-rolled:			
Not containing alloy	5,765	5,080	10,845
Stainless steel	.....	100	100
Alloy, not stainless	3	1	4
Tin plate, taggers' tin	10,968	12,670	23,638
Terne plate	221	158	379
Tanks, except lined	374	1,442	1,816
Shapes, not fabricated	5,603	5,404	11,007
Shapes, fabricated	2,180	1,418	3,598
Plates, fabricated	153	147	300
Metal lath	85	79	164
Frames and sashes	105	41	146
Sheet piling	546	167	713
Rails, 60 lbs.	3,681	2,912	6,593
Rails, under 60 lbs.	97	85	182
Rails, relaying	972	182	1,154
Rail fastenings	832	642	1,474
Switches, frogs, crsgs.	58	183	241
Railroad spikes	676	107	783
Railroad bolts, nuts, etc.	123	73	196
Boiler tubes, seamless	439	385	824
Boiler tubes, welded	3	8	11
Pipe:			
Smls. casing, oil-line	4,854	3,229	8,083
Do., welded	61	293	354
Seamless black	415	741	1,156
Pipe fittings:			
Mall. iron screwed	248	309	557
Cast iron screwed	145	85	230
Pipe and fittings for:			
Cast iron pressure	1,170	2,054	3,224
Cast iron soil	663	635	1,298
Pipe, welded:			
Black steel	1,272	1,190	2,462
Black wrought iron	147	492	639
Galvanized steel	1,571	1,496	3,067
Galv. wrought iron	382	203	585
*All other pipe, fittings	286	248	534
Wire:			
Plain iron or steel	1,345	2,022	3,367
Galvanized	2,477	2,118	4,595
Barbed	1,937	2,379	4,316
Woven-wire fencing	198	207	405
Woven-wire screen cloth:			
Insect	29	34	63
Other	114	109	223
Wire rope and cable	379	242	621
Wire strand	102	40	142
Electric welding rods	62	88	150
Card clothing	3	6	9
Other wire	450	570	1,020
Wire nails	1,176	1,528	2,704
Horseshoe nails	53	66	119
Tacks	22	13	35
Other nails, staples	252	309	561
Bolts, machine screws	549	586	1,135
Castings:			
Gray iron (incl. semi-steel)	219	259	478
Malleable iron	132	120	252
Steel, not alloy	190	36	226
Alloy, incl. stainless	200	78	278
Car wheels, tires, axles:			
†Car wheels and tires	655	791	1,446
†Car axles, no wheels	62	570	632
†Car axles with wheels	610	24	634
Horseshoes and calks	30	1	31
Forgings, n.e.s.:			
Not containing alloy	618	397	1,015
Alloy incl. stainless	72	8	80
Total	134,777	134,788	269,565
Scrap, iron and steel	222,704	225,434	448,138
Scrap, tin plate	805	857	1,662
Tin plate circles, strips, cobbles, etc.	546	782	1,328
Waste-waste tin plate	858	811	1,669
Total scrap	224,913	227,884	452,797
GRAND TOTAL	359,690	362,672	722,362
Iron ore (gross tons)	1,079	244	1,323

*New class. Includes flanged malleable cast iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

Machinery Imports Down

■ United States imports of industrial machinery in 1938 were valued at $9,274,591, a 27 per cent decrease from $12,731,443 in 1937. Germany supplied $4,464,682, or 30 per less than in the preceding year. Sweden was the principal supplier of antifriction bearings and pulp and paper machinery and the United Kingdom of tobacco machinery.

Declines were noted in practically all lines except wrapping and packaging machinery from Germany and pulp and paper equipment from Sweden.

Road Machinery Exports Hold at High Level

■ Following a 75 per cent increase in 1937, compared with 1936, to the record value of $34,550,000, United States exports of roadmaking and allied equipment leveled off during 1938 to a value of $35,895,000, according to the machinery division, department of commerce.

Canada took 14 per cent, $4,975,000; Europe 21 per cent, $7,653,000; South America $7,635,000, 21 per cent; and Africa and Oceania $10,744,000. The latter two have taken 32 per cent of these exports since 1933. Asiatic markets bought machinery valued at $2,751,000 in 1938.

U. S. Imported 48,745 Tons Iron, Steel from Germany

■ In connection with the placing of a 25 per cent countervailing duty on imports from Germany figures available at the department of commerce show that during 1938 the United States imported 48,745 tons of iron and steel products from Germany against 75,898 in 1937.

The bulk of German exports to the United States included shapes and pipe. The department's figures indicate that about 20 per cent of iron and steel imports into the United States have been coming from Germany.

Issue Patents on Du Pont "Sink-and-Float" Process

■ Six patents covering a "sink-and-float" process for separating minerals have been granted by the United States patent office to the E. I. du Pont de Nemours & Co. Inc., making it available for immediate development in the coal industry. Tests have been under way at the Weston Coal Co.'s plant, Shenandoah, Pa., over the past two years. It is said the process also will be applicable to iron and other ores.

Explaining it to the American Institute of Mining and Metallurgical Engineers in New York (STEEL, Feb. 20, p. 68) W. B. Foulke, of the Du Pont company, predicted application would more than double the life span of American iron ore deposits, and also would reclaim large quantities low grade coal.

■ Factory shipments of household washers in February attained the greatest one-month total since September, 1937, aggregating 129,995.

Capacity Center For Sheets, Strip

■ GEOGRAPHICAL center of capacity for producing hot-rolled sheet and strip steel in the United States has moved only a few miles since 1926, despite the fact total capacity for making those products has been about doubled since that year.

At the end of 1938, the center as calculated by the American Iron and Steel institute, was located near Shelby, Richland county, O. That was only about 25 miles west and north of the center in 1926, a point in Wayne county, Ohio, near Wooster.

An earlier calculation by the institute placed the center of sheet steel consumption in Paulding county in northwestern Ohio, and the center of strip consumption a few miles from Toledo.

Between 1926 and 1930 the center of capacity traveled 15 miles south and west to Perrysville, Ashland county, O. Among the principal causes were increases in sheet and strip capacity in Indiana and Illinois, while the pull toward the south exerted by additional capacity in West Virginia, southern Ohio and Kentucky overcame the influence of the development of Detroit as a producing center.

Westward Movement Noted

By 1935 the center had moved about 30 miles farther westward, and was again about as far north as in 1926. The calculated center was in Crawford county, about halfway between Bucyrus and Galion. Substantial increases in capacity in the Chicago and Detroit areas were largely responsible for the movement during that period.

An about-turn in the direction traveled by the center took place between 1935 and 1938. The center of capacity at present is about 20 miles east of its location in 1935, and is slightly farther north than in that year.

Sheet and strip capacity in Detroit, Chicago and in most of the other areas west of Ohio continued to show increases between 1935 and 1938, but these were more than offset by gains in areas farther east, such as Maryland, New York, western Pennsylvania and the eastern half of Ohio.

Reduce Rate on Oil Pipe

■ Cotton Belt railroad has announced a reduction from 50 cents to 23 cents per 100 pounds on steel pipe shipments from Memphis, Tenn., to Louisiana points. Pipe from Pittsburgh is carried to Memphis by Ohio river barge and distributed from there by rail. Recently much of this business has been lost to Houston, Tex., and the lower rate is made to save for Memphis the heavy oil field tonnage, estimated at $1,000,000 per year.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 25	Change	Same week 1938	Same week 1937
Pittsburgh	48	— 2	30	93
Chicago	56.5	None	31.5	83.5
Eastern Pa.	40	None	29	58
Youngstown	54	None	29	85
Wheeling	63	—10	41	97
Cleveland	52.5	— 2.5	30.8	80.5
Buffalo	37.5	+ 4	30	90
Birmingham	78	None	66	80
New England	65	None	18	85
Cincinnati	55	None	45	80
St. Louis	57.5	None	37	82
Detroit	72	— 4	27	100
Average	55.5	— 1	35	90

Trade Association Leaders To Confer in Washington

■ Participation by trade associations in such national problems as industrial mobilization in the event of war, and steps toward preventing obstacles to free flow of commerce which is threatened by raising of trade barriers by certain states, will be discussed at the spring meeting of the American Trade Association Executives in Washington, May 1-2. Control of industrial statistics by governmental sources also will be considered. Headquarters of the association are at 726 Jackson place, Washington.

Observe Irvin Anniversary

■ First anniversary of operations at Carnegie-Illinois Steel Corp.'s Irvin Works at Clairton, Pa., was celebrated with a banquet at Hotel William Penn, Pittsburgh, March 18. Company executives and 300 mill supervisors attended.

Speakers included J. L. Perry, president; J. E. Lose, vice president; H. G. McIlvried, general superintendent of the plant; and L. S. Dahl, assistant superintendent. The first mill operated was the cold reduction stand, although construction of the plant was not completed until some months later.

■ Bureau of internal revenue has announced a refund of $31,114.39 to the Pittsburgh Crucible Steel Co., Pittsburgh, as overassessment of taxes for 1936 on undistributed profits.

PRODUCTION

■ STEELWORKS operations last week declined 1 point to 55.5 per cent, with small decreases in four districts and a gain at one. A year ago the rate was 35 per cent; two years ago 90 per cent.

Youngstown, O.—With three bessemer furnaces and 46 open hearths in production the rate was steady at 54 per cent. Republic Steel Corp. plans to drop one open hearth at its Youngstown plant this week.

Cleveland — Curtailment at two plants reduced the rate 2.5 points to 52.5 per cent.

Chicago — Unchanged at 56.5 per cent, increases by three producers balancing curtailment of bessemer output by another.

Detroit — Off 4 points to 72 per cent after three weeks at 76 per cent. The reduction resulted from use of smaller furnaces at the Ford plant. An upward trend through April is expected.

Birmingham, Ala. — Steady at 78 per cent, 18 open hearths in operation.

Cincinnati — Held at 55 per cent, close to a steady rate of steel buying, which is somewhat above 50 per cent of finishing capacity.

St. Louis — Dropping of an open hearth by one interest and addition of one by another resulted in the rate remaining at 57.5 per cent for the third week.

Buffalo — Increased 4 points to 37.5 per cent, highest since early February.

Central eastern seaboard — Continued at 40 per cent for the third week.

New England — Steady at 65 per cent for the third week.

Pittsburgh — Down 2 points to 48 per cent, with indications for the same rate this week.

Wheeling — Reduction of 10 points to 63 per cent is expected to be regained this week as activity is resumed by one plant idle last week.

River Shipments Lower

■ Less steel was shipped by way of rivers in the Pittsburgh district during February, according to United States engineers' figures. Shipments of all products also decreased. Totals are:

Steel Products, net tons

	February	January	Jan. 1938
Ohio	93,600	105,100	73,250
Allegheny	4,700	6,650	2,400
Monongahela	60,500	56,950	48,862

All Products, net tons

Ohio	879,850	1,002,750	686,378
Allegheny	134,750	174,675	109,939
Monongahela	1,556,900	1,568,000	1,040,277

Pays Tribute to Scrap Collector

■ MOST effective contribution to conservation actually being made is, perhaps, by the secondary metal industry in collecting discarded metals and returning them to use, James S. Earle, of the bureau of mines, told the annual convention of the National Association of Waste Material Dealers in Chicago last week. About 600 attended.

During the last quarter century, Mr. Earle said, more than 16,000,000 tons of copper, 12,000,000 tons of lead, 11,000,000 tons of zinc, approximately 750,000,000 tons of pig iron and close to 2,000,000 tons of aluminum have been mined or produced in the United States.

Will Use More Scrap

"Since it is apparent the use of metals will continue to increase for many years to come, it is evident that as time goes on the reclamation of scrap will provide an increasing proportion of our annual metal requirements."

Mr. Earle invited the waste material dealers' co-operation and suggestions regarding the secondary metals section in the metal economics division of the bureau of mines. This section, located at Pittsburgh, is now busy consolidating the various statistical activities which the bureau has developed; later it will turn attention to improving the fact-finding functions.

One of the serious problems confronting the scrap metal trade is unfair and ruinous competition, declared Harry S. Goldstein, L. Goldstein Sons, Philadelphia, who was elected president of the association.

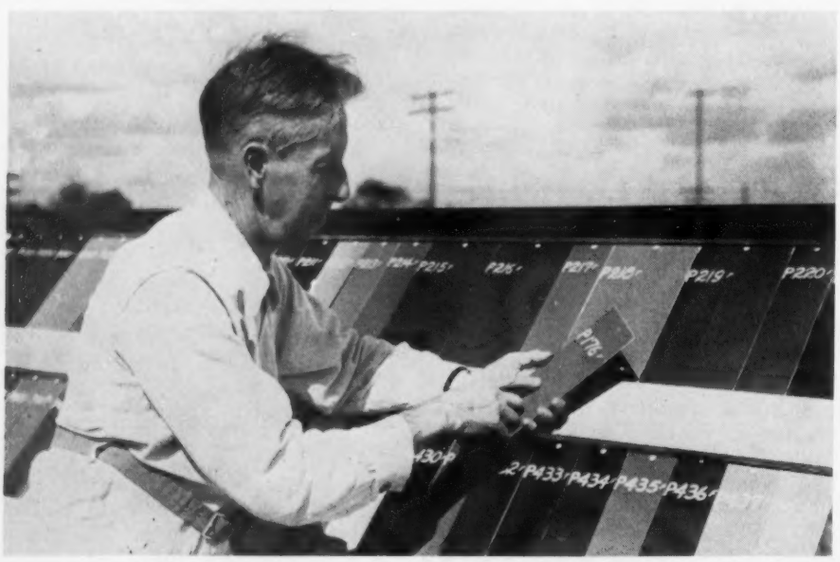
Mr. Goldstein scored the practice of some consumers going direct to the source of the scrap metal trade's supply, urged the membership to cooperate to protect the industry.

"The day of individualism is gone," he said. "The day of secrecy is gone. The scrap metal business is no longer a cellar business. It is an industry, a very important industry, important to the industrial life of this nation, and important to the nation in time of war as well as in peace."

Louis Lippa, Apex Smelting Co., Chicago, was elected vice president of association. Directors elected: George Birkenstein, I. Cohen, David Feinberg, Samuel Ferer, Egmont L. Frankel, E. B. Friedlander, Albert T. Hicks, E. J. Keller, Nathan Kurtz, Milton Levenson, Carlton B. Overton, Joseph Schapiro, J. V. Spachner, William Steck, J. H. Tyroler, Samuel Appel and H. L. Green.

Ben Friedman, Hammond, Ind., was elected president of the Secondary Metals institute; I. W. Willencheck, Metallurgical Products Co., Philadelphia, was elected vice president.

Auto Finishes Tested by Exposure at Miami



■ Year-round residents of Miami, Fla., are these steel panels at the outdoor paint proving ground maintained by Chrysler Corp., Detroit. Racked at an angle to provide uniform exposure, some 1200 panels, finished in all types of paints, lacquers and enamels, are left to the elements for a year, with examinations made monthly in Miami and quarterly in Detroit. After the first three months of exposure the entire right half of a 6 x 12-inch panel is polished. After six months, the lower 3 inches is polished; after nine months, the lower 6 inches, and after 12 months, the lower 9 inches. This gives a variety of surfaces and exposures for later study

Robertson Urges End of Rule by Minorities

■ Government by minorities in the United States must end, declared A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co., speaking before the Cincinnati chamber of commerce last week.

"The time has come," he said, "when we must face our problems as citizens of our whole country and not as members of minorities. . . . The tremendous increase in taxes in recent years has been due almost entirely to meet the demands of minorities."

What the world needs, he continued, is a social research laboratory to which it might submit its problems to learn which are wise and which are foolish.

Auto Employes Safer At Job Than at Home

■ General Motors Corp., Detroit, has reported a new all-time industrial safety record in 1938 for its 86 plants in the United States and Canada.

For every 125,000 eight-hour days of operation last year there were only 4.91 lost-time accidents, compared to 5.15 lost-time accidents in 1937 and 5.19 in 1936.

The severity of accidents, representing time off due to mishaps in the plants, likewise was reduced during 1938 to a point where there were only 0.595 days lost to employes for every 1000 hours worked. This compares with 0.652 in 1937 and 0.664 in 1936.

Seven General Motors plants had no lost-time accidents during the entire year, and two of these, the Packard Electric and Sunlight Electrical plants of Warren, O., completed their second year of a perfect safety record without a lost-time accident

On the basis of records of the National Safety council, an employe of General Motors is safer at his job in a plant than he is at home or going to and from work.

■ Japanese plans for developing pig iron production in North China over the next four years include putting into blast a 250-ton furnace 15 miles west of Peiping. Similar projects partly complete in Shansi province are planned to provide capacity for 140,000 tons of pig annually.

Iron ore production in southern Chahar province is being developed and output is expected to reach 2,000,000 tons annually by 1941.

LABOR

STEELWORKERS EARN MORE WAGES PER TON OF OUTPUT

■ WAGE-EARNING employes in the steel industry in 1938 received more wages per ton of production than in any of the preceding four years, according to the American Iron and Steel institute.

Productivity per man-hour of work, however, was somewhat lower than in any year of that period except 1934.

For every ton of steel and pig iron produced for sale last year, manufacturing employes were paid an average of $18.40, exclusive of salaries or payrolls of mining or transportation subsidiaries.

Because relatively large tonnages of pig iron and semifinished steel are included in the total tonnage of iron and steel products produced for sale, indicated average of direct wages per ton is lower than would be the case for the production of a ton of finished steel.

Direct wages paid per ton in 1938 averaged 6 per cent above the 1937 average of $17.40 per ton, and 28 per cent above 1936 when the corresponding figure was $14.40 per ton.

Production per man-hour of work averaged about 102 pounds in 1938, a decline of about 5 per cent from the 1937 average of 107 pounds per man-hour.

GOODRICH WORKERS LONG IN SERVICE; NO AGE BAR

B. F. Goodrich Co., Akron, O., manufacturer of rubber products, in its current employes' magazine, states nine out of ten have been with the company five years or more; six out of ten for ten years or more, and one out of eight 20 years or more. In the pneumatic tire curing department nine-tenths are 40 years old or over and not one is under 30 years old. Approximately three-tenths of employes in this department are 50 years old or over, and one man in every 20 is 60 or over.

Average age of all men employes is 42 years, and of women 37 years. More than 20 per cent of the men are 50 or older and only 15 per cent are under 30. Approximately 15 per cent of women employes are 45 years old or over and only 11 per cent are under 25 years.

HARVESTER CO. EXPLAINS OPERATIONS TO EMPLOYES

International Harvester Co., Chicago, in a pamphlet report to employes explains its operations for 1938 and the ten years from 1929 through 1938. The 10-year summary discloses 56.7 per cent of total receipts were expended for materials, supplies, fuel, taxes, depreciation and other expenses of manufacture and distribution. To employes, 33.4 per cent was paid in compensation; 6.4 per cent went to stockholders as dividends; 1 per cent to the employes' pension fund; 0.3 per cent for executive salaries; and 2.2 per cent remained in the business to provide new and improved facilities.

In 1938, compensation to employes declined 23.2 per cent, from $125,000,000 to $96,000,000; hourly wages, however, were higher than in 1937. Dividends in 1938 were 38.8 per cent lower; executive salaries, 27.7 per cent lower.

President Sydney G. McAllister points out the decline in agricultural income last year caused the decline in the company's sales and operations.

Thanking employes for their cooperation, he adds: "Nothing is more essential to the success of a business than the efficiency which comes about when stockholders, employes and management recognize the fair and reasonable claims of each and work together to solve their common problems. The fundamental problem of every business is to keep itself solvent, efficient and well equipped to furnish customers high grade products at fair prices . . . . Only in this way can we keep the wheels of industry going and create employment."

"WORKERS, OWNERS HAVE EXACTLY SAME INTEREST"

Ralph E. Day, president, Bridgeport Brass Co., Bridgeport, Conn., in the company's first annual report to employes emphasizes "the workers and the owners have exactly the same interest and are equally dependent one upon the other."

The owners, he explained, are not one or two so-called "rich men," but 8000 persons with average holdings of less than 120 shares. These investors have risked $4638 for each jobholder in the company.

The report closely follows the report to stockholders, presents in informal, nontechnical terms the company's balance sheet and income statement. In addition it includes a 10-year record which shows a total of $32,928,913 paid employes in wages; net gains in the decade totaled $2,250,882.

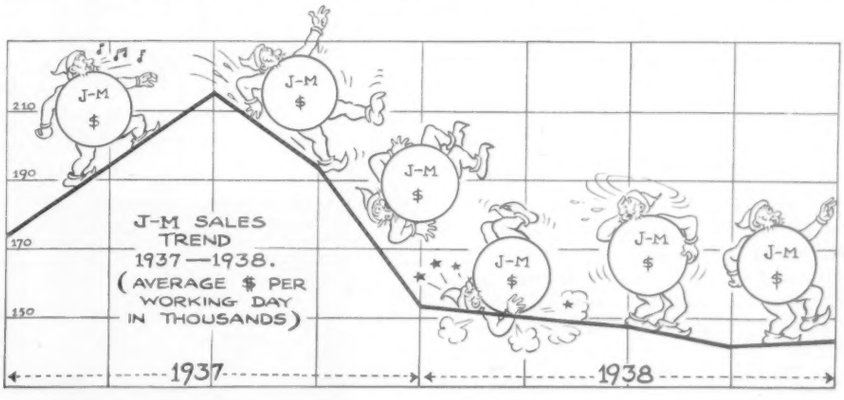
STEEL & WIRE HONORS 281 VETERAN EMPLOYES

Two hundred eighty-one employes with combined service record of 8185 years were presented service medals by American Steel & Wire Co., Cleveland, at a luncheon at its American Works recently.

All are employed in the Cleveland district and have been with the company more than 25 years. The group averages 29.1 years per man, ranging from 141 in the 25-year class to seven who have served more than 45 years. Individual honors went to Frederick Maher, foreman at American Works, with 49 years, 6 months.

Attending the luncheon were high officials of the wire company.

Shows Employes What Happened to Sales Dollar in 1938



■ Johns-Manville Corp. created the above gnome-like figure, symbolic of the company's sales dollar, to simplify and humanize the story of its business. Company's report to employes explains jobholders received 32 cents of every sales dollar; stockholders received two cents; one cent was put aside as a reserve; 65 cents were expended for raw materials, transportation, taxes and other expenses.

Report stresses importance of company's research program, explains 40 per cent of employment in its plants today results from sales of products developed in the past ten years.

While troubled conditions abroad and unsettled economic problems at home obscure the outlook, President Lewis H. Brown assures employes: "Business is better than it was at the beginning of 1938 and I feel our prospects for 1939 are somewhat brighter."

MEN OF INDUSTRY

■ CHARLES M. POND and Hubert D. Tanner have been appointed vice presidents, Niles-Bement-Pond Co., Hartford, Conn. In addition to their new responsibilities, both will continue their present duties, Mr. Pond as manager, small tool and gage departments, and Mr. Tanner as manager, machinery department.

Mr. Pond joined the company in 1903 as an apprentice; three years later was transferred to the sales department at New York and in 1909 was sent to Cleveland where he opened the company's first small

Charles M. Pond

tool store. In 1914 Mr. Pond was recalled to Hartford to become sales manager, small tool division, subsequently becoming assistant manager and manager of that division. In 1928 he was appointed to the managership, small tool and gage departments.

Mr. Tanner joined Pratt & Whitney, division Niles-Bement-Pond, in 1920 as an engineer. He has been in charge of the development of gear grinding machines, and also has done sales engineering work. Mr. Tanner is well known in the automotive industry for his work in connection with automobile transmission gearing. He is a member, American Society of Mechanical Engineers, Society of Automotive Engineers and American Gear Manufacturers' association.

♦

H. W. Schnetzky, formerly president, Wisconsin Motor Co., Milwaukee, maker of internal combustion engines, has become identified with Murphy-Diesel Co., Milwaukee.

♦

Arthur Nordquist, of Flinn & Dreffein Co., Chicago, has sailed to Calcutta, India, to construct six large pack and pair furnaces of Flinn & Dreffein manufacture that will be installed in the new sheet mill of the Steel Corp. of Bengal, Napuria, Bengal, India.

♦

Victor Brook, chief engineer and sales engineer, High Speed Hammer Co. Inc., Rochester, N. Y., has resigned to become a manufacturer's representative with headquarters at 433 Rockingham street, Rochester.

♦

Max W. Babb, president, Allis-Chalmers Mfg. Co., Milwaukee, recently was honored by having conferred on him the degree of doctor of laws by Iowa Wesleyan college, Mount Pleasant, Iowa.

♦

Werner J. Westphalen, vice president and general manager, Lacledе-Christy Clay Products Co., St. Louis, has been named president, to succeed the late John L. Green. Mr. Westphalen is also president, American Refractories institute.

♦

J. F. Apsey Jr., advertising manager, Black & Decker Mfg. Co., Towson, Md., and G. Van Alstyne, advertising manager, Air Reduction Sales Co., New York, have been elected directors, Exhibitors Advisory Council Inc., New York.

♦

Herman Klein, Cincinnati Milling Machine Co., Cincinnati, has been elected president, Industrial Advertisers of Cincinnati. Other officers are: Vice presidents, Malcolm McPherson, Alvey-Ferguson Co., and Richard Hext, Littleford Bros. Co.

♦

O. D. McClure, Ishpeming, Mich., chief mechanical engineer, Cleveland-Cliffs Iron Co., and general manager for Cliffs Power & Light Co., will retire from active duty in April, but will continue in a consulting capacity until April 1, 1940. He will be succeeded by L. C. Moore, now assistant at Ishpeming.

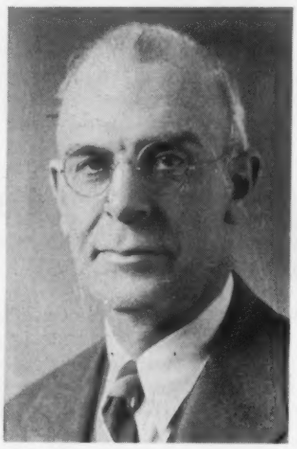
James H. Robins
Elected president and a director, American Pulley Co., Philadelphia, as noted in STEEL, March 13, page 30

♦

Leo F. Hunderup, the past two years assistant general manager, Van Norman Machine Tool Co., Springfield, Mass., has been elected a vice president. He joined the company 11 years ago and formerly was sales manager of the automotive division.

♦

B. W. Dreyer has been transferred to Los Angeles as district manager for Steel & Tubes Inc., subsidiary of Republic Steel Corp., Cleveland. Mr. Dreyer joined Steel & Tubes in 1929, remaining in Cleveland until March 1, 1936, when he was transferred to



Hubert D. Tanner

Indianapolis as a sales representative. He will be succeeded by T. M. Everhard, who joined the company in 1936 as a sales apprentice. Mr. Everhard went to Indianapolis early this year.

♦

Karl C. Provance has become associated with the Urick Foundry Co., Erie, Pa., in a sales capacity. He was formerly with Koppel Industrial Car & Equipment Co., Koppel, Pa.

♦

Roy C. Muir, vice president in charge of engineering, and chairman of the education committee, General Electric Co., Schenectady, N. Y., has been selected by the board of regents, University of Wisconsin, to receive the honorary degree of doctor of engineering at the 1939 commencement exercises in June.

♦

Milton J. Sandling has been appointed vice president in charge of sales, Howell Electric Motors Co., Howell, Mich. Mr. Sandling worked in the main offices two years, later being transferred to a sales position in Detroit, and the past 15 years has

been district sales representative for southwestern Michigan, with headquarters in Battle Creek.

♦

G. B. Schuyler has been elected executive vice president, Apex Electrical & Mfg. Co., Cleveland. S. W. Taylor has been made vice president; William A. McAfee, secretary, and J. C. Bradley, treasurer.

William E. Wickenden, president, Case School of Applied Science, and E. J. Kulas, president, Otis Steel Co. and Midland Steel Products Co., have been elected directors of the Apex company.

♦

Karl F. Bruch, heretofore vice president, Acme Machinery Co., Cleveland, has been elected president. E. P. Bruch, in addition to

H. N. Anderson

his duties as secretary, has also been elected treasurer. Sons of F. W. Bruch, founder of the company, they have each worked in the plant more than 25 years.

H. N. Anderson, who has been with the company in the capacity of sales manager the past 15 years, has been made vice president and general manager; H. A. Akers, assistant secretary, and W. A. Phillips, assistant treasurer.

Directors include K. F. and E. P. Bruch, Mr. Anderson, L. N. Davenport, R. W. Hisey, and D. R. Davies, chairman. Other operating executives are: M. W. Lamprecht, chief engineer; A. O. Anderson, superintendent; George A. Smart, sales manager.

♦

F. A. Westphal, superintendent, wire mills, Sheffield Steel Corp., Kansas City, Mo., was re-elected president Wire association, for the 1939-1940 term, at the annual meeting of the board of directors in New York, March 10. Other officers re-elected are: Vice president, ferrous division, John C. Callaghan, works manager, Canada works, Steel Co. of Canada Ltd., Hamilton, Ont.; vice

Karl F. Bruch

president, nonferrous division, E. W. Clark, mechanical engineer, wire and cable section, General Electric Co., Schenectady, N. Y.; executive secretary, Richard E. Brown, 17 East Forty-second street, New York.

New directors whose three-year terms commenced with the meeting are: D. D. Buchanan, assistant general manager, Union Drawn Steel division, Republic Steel Corp., Massillon, O.; C. E. Johnson, superintendent, rod and wire mills, Bethlehem Steel Co., Sparrows Point, Md.; John A. Moritz, superintendent, wire mills, Keystone Steel & Wire Co., Peoria, Ill.; Sidney Rolle, assistant manager, Scomet Engineering Co., New York.

♦

Samuel M. D. Clapper, chairman, General Refractories Co., Philadelphia; Alfred R. Hunter, Ritter & Co., New York, and John F. Hedley, Montgomery & McCracken, New York, have been elected directors, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

♦

Eugene A. Hood, Southern Converting Co., Greensboro, N. C., was elected chairman of the North Carolina state committee, Southern chapter, Institute of Scrap Iron and Steel Inc., recently organized by 75 iron and steel scrap dealers. Alec Rawls, Alec Rawls Wrecking Co., Rocky Mount, N. C., was chosen vice chairman, and Morris Brenner, Brenner Iron & Metal Co., Winston-Salem, N. C., secretary-treasurer.

DIED:

■ GEORGE WARD FULLER, 87, former vice president, Ingersoll-Rand Co., New York, March 17 in New Rochelle, N. Y. He was engaged in the manufacture of machinery many years and was manager, A. S. Cameron Steel Pump Works, Phillipsburg, N. J. When that company was acquired by Ingersoll-Rand he became vice president, retiring 20 years ago.

♦

E. C. Striffler, 70, the past 20 years president, Edward C. Striffler Inc., New York, jobber in iron and steel, March 20 in Montclair, N. J.

♦

Louis J. Freundt, 66, assistant district sales manager, American Can Co., Chicago, in that city, March 17.

♦

Marshall B. Waterman, 72, a director, L. S. Starrett Tool Co., Athol, Mass., recently at his winter home in Haines City, Fla.

♦

Charles B. Coates, 69, inventor and electrical engineer, Chicago Pneumatic Tool Co., in Cleveland, March 17. He was associated with Chicago Pneumatic about 30 years.

♦

Leonard C. B. Holmboe, 79, retired chief engineer, Carnegie - Illinois Steel Corp., Chicago, in that city, recently. He had been with the company over 50 years, retiring in 1931.

♦

Samuel Hiram Schneider, 52, executive secretary, Association of Western Railways, March 17 in Chicago. He had been with the association since 1915.

♦

Edward C. Duffy, retired executive, International Harvester Co., Chicago, in Chicago, March 17. He joined the company in 1902 and retired in 1932, after having served for a time as manager of the Capetown, South Africa, branch.

♦

O. E. Letchworth, 87, March 11 at his home in Canandaigua, N. Y. He was president, Pratt & Letchworth Co., Buffalo, maker of iron and steel castings, and United States Hame Co., until his retirement in 1911. He was also a director, Great Lakes Engineering Co., Detroit.

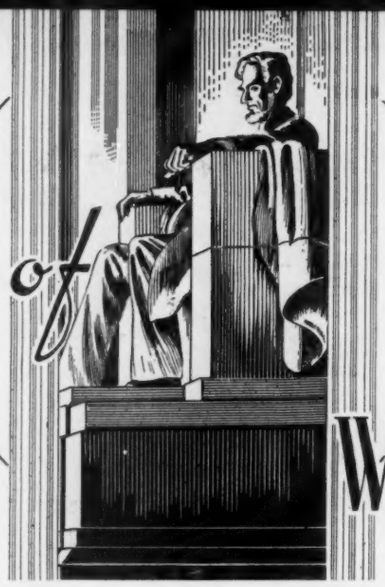
♦

E. John Hicks, 57, president, Merchants Steel & Supply Co., Chicago, in that city, March 18. He was one of the largest iron and steel scrap operators in the Chicago district. The business will be continued by his two sons, Hunter and E. John Jr.

♦

Louis D. Allen, 71, founder, L. D. Allen Metal Works, Chicago, March 14 in Chicago. Until 1900 he was with Magnolia Metal Co., following which he founded his own firm. After doing wartime research work for the government Mr. Allen became sales manager, white metal department, Federated Metals division, American Smelting & Refining Co. He retired in 1926.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ STATEMENTS by the President last week made more doubtful revision in corporation taxes in the interest of business recovery.

At press conference the President indicated simplification of the tax structure by repeal of the excess profits and capital stock taxes would raise possibly insurmountable difficulties.

As pointed out in this column last week, there is considerable "buck passing" between the administration and members of congress, and it is likely to be some weeks yet before any kind of a tax program can be agreed upon. The President insists the burden of proof rests with congressional economic experts to show that business would respond to curtailment of government expenditures and he disavowed responsibility for any effort to renew tax deterrents.

Mr. Roosevelt said he is in a receptive mood so far as tax revision in the interest of business recovery is concerned, but he clearly indicated that at the moment he is simply answering questions presented to him by members of congrss as to what various tax proposals will yield. He stated that what he has said all along is still true—that the tax question is still in the study stage. The Chief Executive indicated he does not favor the proposal to abandon the 2½ per cent undistributed profits tax.

Upholds Relief Policy

Mr. Roosevelt says he still believes in the relief policy and related subjects which he discussed in his annual message to congress.

"In other words," he said, "we have the choice of following the policy recommended in the annual message or adopting the policy which has been advanced by perfectly well-meaning people, that is, cutting down certain expenditures of the government, which, as I pointed out in that annual message, must, in order to be substantial, come out of certain obvious items which can be readily cut.

"They include: Relief for the unemployed, all forms of public works, social security for the aged, slum clearance and various other items which today give work in large volume—all of those being predicated on the guess of many well-meaning people that thereby, taking away employment from several million workers, business will automatically pick up and employ that entire slack plus the other large number of people who are out of work but not in any way being helped by the government.

"If there was some guarantee that this would happen, it would be worth considering. I doubt, however, whether this would meet with popular approval if it were tried and the results were not attained."

ECONOMIC COMMITTEE'S PROGRAM UNCERTAIN

The temporary national economic committee apparently is again going on a fishing expedition. While no definite plans have been worked out for further hearings, committee experts are toying with the idea of holding hearings dealing with foreign cartels. Another question which is being considered deals with the small business, and still another is the suggestion that business itself be granted hearings dealing with its own practices. It probably will be a couple of weeks before further hearings will be held.

Senator O'Mahoney, committee chairman, last week issued a statement on the hearings:

"It does strike me as of the greatest importance that the story told by the federal trade commission was one of the restraints which business has placed upon itself and from which government has been constantly trying to free it. In compliance with the plan of the committee, the federal trade commission presented the story of its activities during the last seven years. It was demonstrated that throughout this period every complaint brought by the federal trade commission against any business unit was brought at the instance of some other business unit and was not initiated by the federal trade commission on its own motion.

"The commission listed 45 major types of commercial practice employed by business to restrain competitors and to destroy the natural effects of competition. When government intervened through the commission, it was only at the invitation of business men to preserve a greater degree of freedom on the part of those who believe that they were being made the victims of practices which were either unfair or illegal.

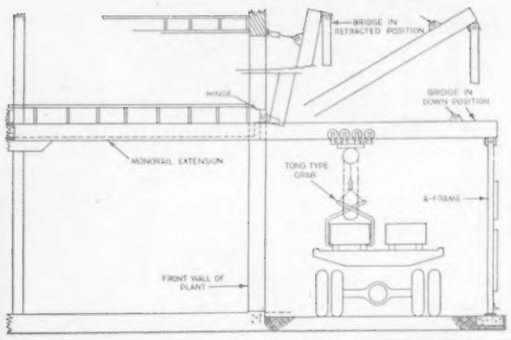
"Again, it was clear from the testimony that, although congress, in response to public demand, has over a long period of years enacted so-called 'antitrust laws', none of them was proof against avoidance and none of them prevented the steady development of private concentration of the control of business and industry.

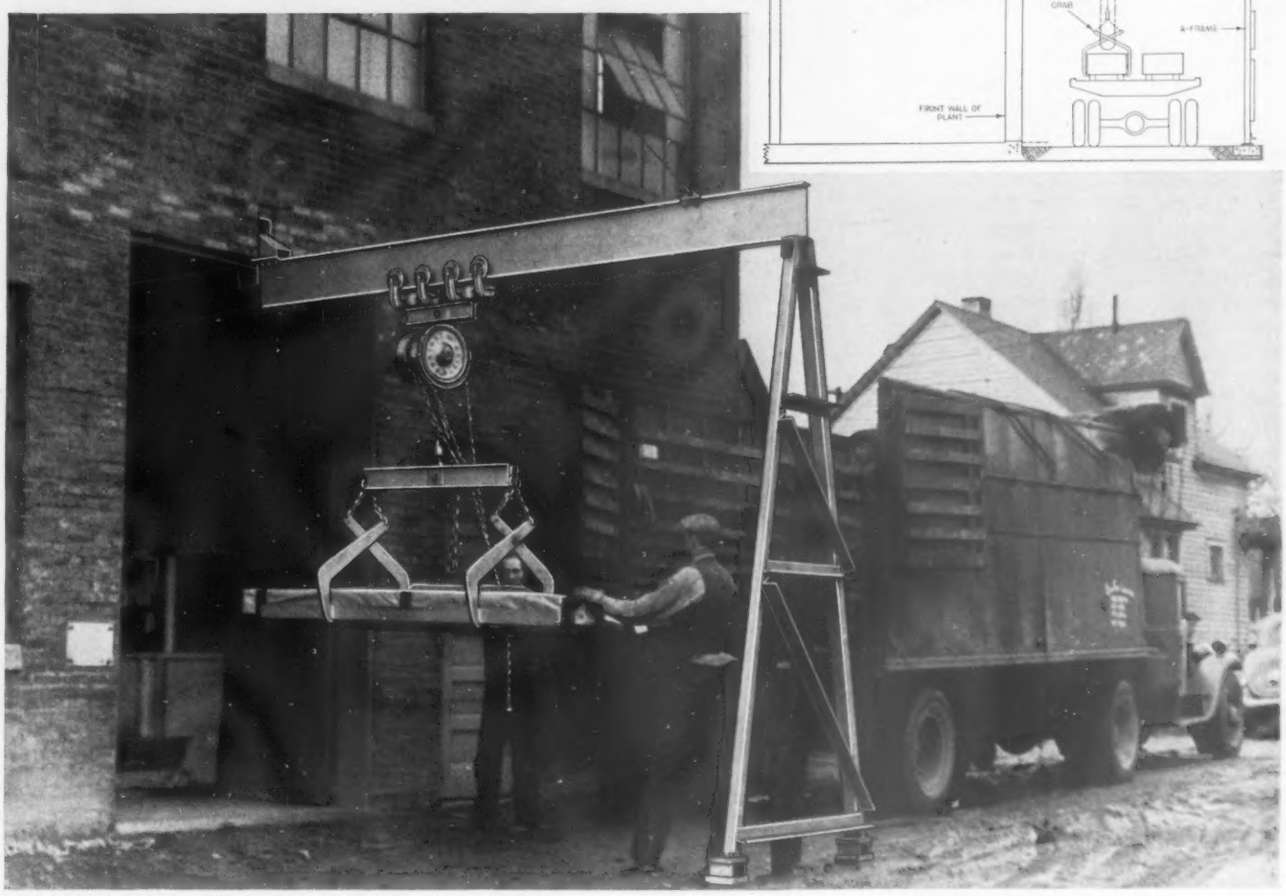
"Testimony was introduced to show that this development was at least an influential factor in reducing opportunities for investment. Small and new business should provide important avenues for new investment, and, where their development is hampered by the type of practice illustrated by the testimony, the opportunity for investment is reduced. This is one reason why banks, to use the ordinary phrase, are 'bulging with money'."

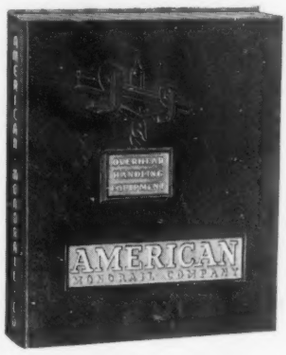
CONSIDER AMENDMENTS TO WALSH-HEALEY LAW

Senate committee on education and labor last week again delayed hearings on amendments to the Wagner labor act. The committee in executive session decided it would vote March 28 whether amendments to the act should be taken up at the

Retractible Crane cuts handling costs!







A 254 page book used as a technical reference for all data covering MonoRail Equipment will be sent on letterhead request.

In four months this simple MonoRail system saved $150.00 in handling costs. Steel, formerly unloaded sheet by sheet, is now transferred from delivery trucks to storage in 3-ton bundles. Handling labor was greatly reduced, while damage to metal was eliminated.

When not in use, the crane shown in the illustration above is drawn up, over the doorway, against the building to allow passage through driveway.

This system is typical of the hundreds of specially engineered projects illustrated in a new 254 page catalog now available. It represents the service available at no obligation regardless of the size of project.

Let an American MonoRail engineer explain the possibilities of an overhead handling system in your plant. Write for copy of the new catalog.

The American MonoRail Co

13102 Athens Ave., Cleveland, Ohio

present session of congress or not.

Senator Thomas, Utah, committee chairman, has appointed a subcommittee to hold hearings in connection with the amendments to the Walsh-Healey Act. The subcommittee consists of Senator Walsh, chairman, and Senators Pepper, Hill, La Follette, and Davis.

One of the proposed amendments to the act is to lower the amount of money for government contracts coming under the act from the present $10 000 to $2000 and also to make the act apply to immediate subcontractors. A further amendment proposes a penalty clause allowing for double or triple pay in the case of second and third or subsequent violations of the wages and hours provisions of the Walsh-Healey act. The only penalty for violations now is to be put on a government black list.

RAILROADS' IRON, STEEL PURCHASES TOTAL $152,000,000

Iron and steel purchases by class I railroads amounted to $152,176,000 last year, compared with $359,409,000 in 1937, or a decrease of $207,233,000, according to the Association of American Railroads. For locomotive and car castings, beams, couplers, frames and car roofs, the railroads spent $22,221,000 in 1938 compared with $62,373,000 in the preceding year. Purchases of steel rail, including new and second-hand, except scrap, amounted to $23,742,000 in 1938, compared with $44,424,000 in the preceding year. Track fastenings, track bolts, spikes, totaled $16,347,000, a decrease of $20,211,000 from the year before.

For wheels, axles, and tires, the railroads expended $16,691,000, compared with $31,173,000 in the preceding year. For bar iron and steel, spring steel, tool steel, unfabricated rolled shapes, wire netting and chain, boiler, firebox, tank and sheet iron and steel of all kinds their expenditures amounted to $7,910,000, compared with $32,186,000 in the preceding year. Purchases of interlocking and signal material in 1938 totaled $7,484,000, and for standard and special mechanical appliances for locomotives, $6,447,000.

Frogs, switches and crossings purchases were $4,769,000, compared with $12,566,000 in 1937. Iron bridges, turntables and structural steel, all kinds, amounted to $2,451,000 in 1938, compared to $4,133,000 in 1937. Other purchases included $2,045,000 for forgings and pressed steel parts for locomotives in 1938, compared with $4,642,000 in 1937; $4,221,000 for car forgings, iron and steel, and fabricated or shaped steel, for passenger and freight cars in 1938, compared with $18,042,000 in 1937; $3,961,000 for bolts, nuts, washers, rivets, lag screws, pins and studs in 1938, compared with $12,417,000 in 1937; $3,769,000 for track and roadway tools, all kinds, miscellaneous track material and wire fencing, compared with $7,809,000 in 1937; $2,303,000 for machinery and repair parts including all power-driven shop machinery, compared with $5,405,000 in 1937; $4,889,000 for machinery, boilers, repair parts and all other iron and steel products, compared with $9,711,000 in 1937; $2,559,000 for pipe, iron and steel, and fittings of all kinds compared with $6,663,000 in 1937; $2,314,000 for hardware, all kinds, including nails, compared with $3,655,000 in 1937; $3,114,000 for hand and small machine tools, such as drills, taps, reamers, dies, chasers, including air tools and parts, compared with $9,034,000 in 1937; $6,447,000 for standard and special mechanical appliances for locomotives, compared with $13,603,000 in 1937; and $3,435,000 for automotive equipment and supplies, compared with $5,078,000 in 1937.

GOVERNMENT IRON, STEEL AWARDS TOTAL $556,262

During the week ended March 18, the government purchased $556,262.44 worth of iron, steel and their products under the Walsh-Healey act: Lakeside Bridge & Steel Co., Milwaukee, $64,968; Edward Katzinger Co., Chicago, $10,659.74; Dahlstrom Metallic Door Co., Jamestown, N. Y., $12,632; The Central Foundry Co., Bessemer, Ala., $14,604.24; Carnegie-Illinois Steel Corp., Washington, $350,000 (estimated); Raisler Corp., New York, $12,266; Schmitt Steel Co., Portland, Oreg., $17,928; Messinger Bearings Inc., Philadelphia, $40,040; Hunsicker Engineering Co., Lebanon, Pa., $14,495.26; and the American Rolling Mill Co., Middletown, O., $18,669.20.

EXPECT EARLY DECISION ON RESTRAINING ORDER

Government last week filed objections in the court of appeals of the District of Columbia to the request of several small steel firms for a temporary restraining order to prevent the secretary of labor's order setting minimum wages from becoming effective until after the court of appeals has heard the appeal of the manufacturers from the decision of the lower court.

Court of appeals is expected to give decision in few days on the restraining order and will set a date for hearing the appeal of the steelmakers at the next term of court beginning April 3.

ANDREWS WANTS AMENDMENT TO WAGES AND HOURS ACT

Elmer F. Andrews, hours and wages administrator, has insisted up to now he does not want any amendments to the law until he has a better chance to try out its various provisions.

However, Mr. Andrews has just decided he does want an amendment to exempt white-collar workers who earn from possibly $2000 to $3000 a year. The administrator also has talked about an amendment respecting employes who are guaranteed a monthly salary and for whom there might be an averaging workweek over a month.

REPORTS FAVORABLY ON CRITICAL MATERIALS BILL

Representative Faddis, Pennsylvania, at the request of the house military affairs committee last week introduced a new bill providing for the acquisition of $100,000,000 worth of strategic materials including manganese, tin, chrome, mercury, and similar materials. The committee has ordered a favorable report.

Information recently was received by the committee that President Roosevelt would oppose the expenditure of more than $10,000,000 for this purpose instead of $25,000,000 per year for a 4-year period.

The bill as it will be reported by the military affairs committee provides for the acquisition of $100,000,000 worth of strategic raw materials, but the bill will leave to the war department the amount of annual outlay with the understanding that the administration has clearly indicated that it will not spend more than $10,000,000 during the coming year.

Last week also a subcommittee of the house appropriation committee finished consideration of a deficiency bill carrying more than $150,000,000 for national defense. This measure provides $100,000,000 for new weapons and other army equipment; $6,500,000 for seacoast defense; $36,000,000 for naval shipbuilding; and $6,500,000 for development of aircraft research facilities. Also last week the house naval affairs committee approved a bill authorizing $6,500,000 for a naval supply base at Oakland, Calif.

Library for Battelle

■ Battelle Memorial institute, Columbus, O., has received a gift of 600 volumes for its reference library, from the family of the late Major Robert A. Bull. The collection is unusually complete, covering the American and English foundry field. It was collected during Major Bull's active service to the steel castings industry and his two terms as president of the American Foundrymen's association.

The Battelle library contains over 7500 volumes pertaining to metallurgy, ceramics, chemistry, fuels and related subjects, largely used in research work.

AVIATION

LARGE EQUIPMENT PURCHASES SCHEDULED BY FEEDER LINES

■ AIRLINES operating short "feeder" routes currently constitute the most promising domestic market for air transport equipment.

Projected purchases by such companies: National Airlines Inc., St. Petersburg, Fla., 16 transport planes; Pennsylvania-Central Airlines Corp., Pittsburgh, 15; Boston-Maine Airways Inc., East Boston, Mass., 4; Chicago & Southern Airlines Inc., Robertson, Mo., 4; Continental Airlines Inc., Denver, 2; and Mid-Continent Airlines Inc., Kansas City, Mo., 2.

Needs also are disclosed by Braniff Airways Inc., Oklahoma City, Okla., and Delta Air Corp., Monroe, La.

Prospects for buying are enhanced by indications the commercial air transportation industry in general will be out of the red this year. A number of companies showed profits in 1938, and losses in most cases were less than anticipated. In the first two months this year, passenger traffic was 23 per cent over the comparable period in 1938.

Domestic airmail last year grew to a point where for the first time since inception of the service, revenues exceeded the post office department's payments to carriers. Allotments are to be increased by $1,280,000 during the fiscal year of 1940.

Northrop Aircraft Inc., lately organized in Los Angeles, will build a 100,000-square foot factory at Long Beach, Calif. Company plans to manufacture all-metal fighting planes.

Pratt & Whitney engine division of United Aircraft Corp., East Hartford, Conn., soon will let contracts for a plant addition estimated to cost more than $40,000. Architect is Albert Kahn Inc., Detroit.

Army air corps last week opened bids at Wright field, Dayton, O., for twin-engined light bombers. For lots of 300, North American Aviation bid $18,075,000; Stearman division of Boeing Aircraft, $21,205,800; and Glenn L. Martin, $21,375,000. Unit prices ranged from $51,000 if 2000 planes were ordered, to $993,680 for a single ship.

Receive Government Orders

Beech Aircraft Corp., Wichita, Kans., has booked its first government contract, an army order for ten Beechcraft costing about $200,000. Other air corps awards: Hamilton Standard propeller division of United Aircraft Corp., East Hartford, Conn., propeller assemblies, $189,417; and Cambridge Instrument Co. Inc., New York, fuel indicators, $48,784.

Navy department last week ordered airplanes and parts valued at $4,699,057 from Consolidated Aircraft Corp., San Diego, builder of military and civil flying boats.

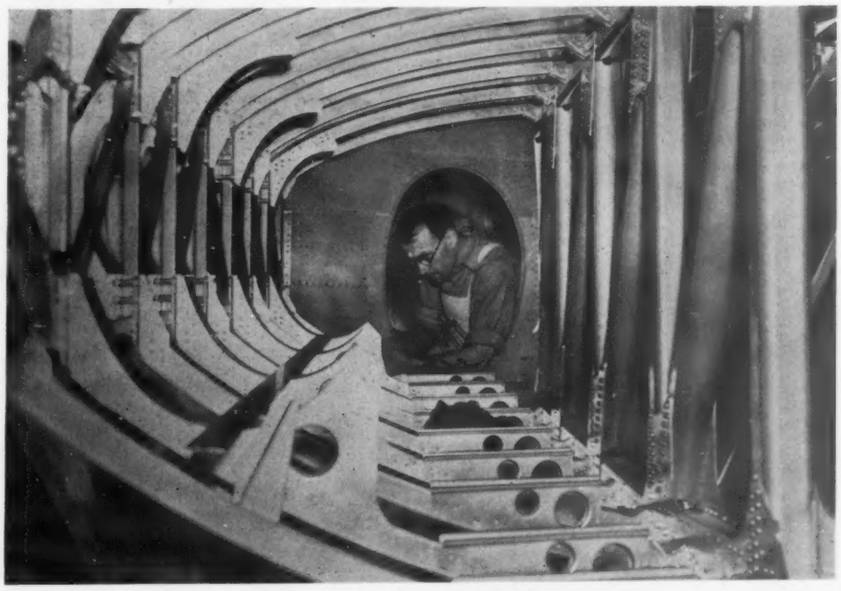
Akron Aircraft Inc., Akron, O., recently formed to build 70-horsepower "crash proof" planes, has received a $50,000 contract for 20 craft from Aero-Ways Inc., Cleveland.

Awards for 1200 airplane engine shields were booked last week by Breeze Corporations Inc., Newark, N. J., from Wright Aeronautical Corp. and Pratt & Whitney. Since Jan. 1 the firm's orders for aircraft products have tripled those during the same period last year.

Foreign contracts just awarded: Waco Aircraft Corp., Troy, O., from Argentine government, 3 cabin planes; and Curtiss propeller division of Curtiss-Wright Corp., Clifton, N. J., French air ministry, 100 propellers.

An automatic synchronizer to eliminate the disturbing "beat" from unsynchronized engines in multi-motored airplanes has been developed by United Aircraft's Hamilton Standard propeller division. Engines are kept at a uniform speed by changing the pitch of each propeller in response to small differential motors co-ordinated with the "master engine."

Structural Detail in Clipper Plane's Giant Wing



■ **Size of the 42-ton, 74-passenger Boeing 314, world's largest commercial airplane, is indicated in this interior view of its wing, looking toward doorway to an engine nacelle in the leading edge. Ship has 152-foot wingspread. First of six ordered by Pan American Airways, it is now undergoing shakedown flights preliminary to opening transatlantic service**

New "Wonder-Drug" Is By-Product of Coke Ovens

■ Sulfanilamide, also called sulfapyridine, the new so-called "wonder-drug" which has been used with considerable success in treating pneumonia and other diseases, is a by-product of the coke industry.

Preparation of the drug begins with pyridine, which has been one of the relatively unimportant products of by-product coke ovens. Pyridine has been used in the preparation of fertilizer. Now it is supplied by Pittsburgh Coke & Iron Co., Pittsburgh, to Merck & Co. Inc., Rahway, N. J. The Merck company converts it into sulfa-pyridine by a process developed in England.

During 1939 the Pittsburgh Coke & Iron Co. expects to make approximately 50,000 pounds of pyridine.

Crane, Buried 8 Months in River, Returned to Service

■ Recovered after falling 23 feet and being buried in river silt for eight months, a crawler crane built by Harnischfeger Corp., Milwaukee, was returned to service after two days' overhauling.

Mishap occurred during construction of the Dos Rios bridge in Colombia, S. A. Heavy current destroyed a preliminary caisson and plunged the crane into the river where it remained until the dry season made possible its recovery. The crane was overhauled and used in completing the bridge.

HOT ROLLED SHEETS *Never Took Such a Beating* AS THIS . . .

This huge 2½-ton Phoenix is symbolic of San Francisco's majestic rise from the ashes of earthquake and fire. Covered with gold leaf, it rests atop the Tower Of The Sun, 400 feet above the 1939 Golden Gate Exposition.

Nine men literally "whaled the daylights" out of iron sheets for sixty days to shape this giant metal Phoenix. Its intricate forming required skilled workmanship and made very severe demands on the metal. Yet using hot-rolled ARMCO Ingot Iron, the contractor finished the job without loss or trouble on a single sheet.

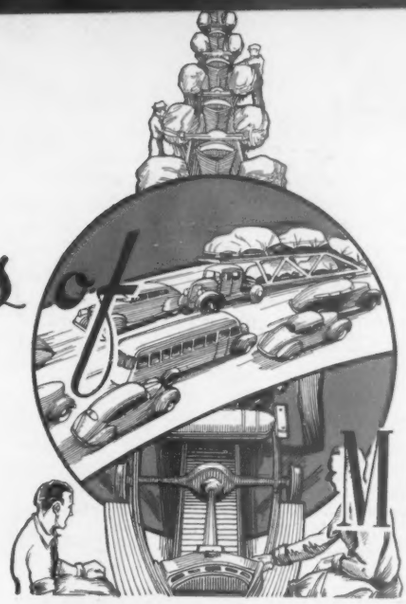
In his own words: "ARMCO Ingot Iron worked beautifully and took the exact shape our hammering gave it. The heavy shaping and driving hammers never punctured a single sheet of the lightest gage metal." This is a remarkable tribute to the tough yet highly workable qualities of hot-rolled ARMCO Ingot Iron. Weldability is aptly demonstrated by over 6,800 feet of running welds used to assemble the 780 square feet of surface area.

You'll find hot-rolled ARMCO Ingot Iron equally suited to your own metal working requirements. It is uniform and ductile, forms accurately to intricate design, and is easy to fabricate. This highly-refined iron not only is the fabricator's delight, but also is noted for its durability. Try hot-rolled ARMCO Ingot Iron whenever you need a sheet metal that will work and weld like a million, and stand up in service. For further information just write us at this address. The American Rolling Mill Company, Executive Offices: 580 Curtis Street, Middletown, Ohio. District Offices in All Principal Cities of United States.

ARMCO

ARMCO INGOT IRON

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ RECENT comparisons in STEEL of the profit performance of General Motors and United States Steel showed strikingly how the steel industry's best customer is far outdistancing it in earnings. To steel men this is a sad commentary, but the explanation is not hard to find.

The auto industry deals with the ultimate consumer; prices on automobiles are determined in advance of production and rigidly adhered to, with pressure from buyers unheard of; and at the same time, the auto industry is able to effect appreciable savings in its buying of materials through a combination of shrewd buying practice and a willingness of some suppliers to sell their products below the market price. The steel industry, on the other hand, must sell its product, not to the man in the street who is incapable of exerting direct influence on prices, but to another industry in which buying is a science and which trades on the weaknesses and whims of the suppliers.

"No Umbrella Holding"

In conversation with the executive head of one of the leading automobile producers here, a steel company representative cited the comparison of profit records in automobiles and steel and inquired about the justification for such a situation. The executive replied in substance as follows:

"True, the large units of the auto industry have shown a good earnings record, against that of the steel industry—but don't forget this—we don't hold an umbrella over the little fellows in our industry. The competition is tough, and the weak sisters fall by the wayside. Look at the record of the past 20 years. See how many car builders have folded up because they couldn't stand the pace. It's different in the steel industry."

On the basis of "umbrella-holding," the two industries are not at all on a comparable basis, but the above represents the views of one prominent executive and probably reflects the consensus of thinking in the automotive industry.

More than once, automobile buyers have openly avowed their disapproval of the steel pricing system, and if the past year is any indication, this disapproval has been translated into concrete results. The concession made last fall on flat-rolled material brought out considerable buying for motor company accounts, and as late as March 1 one steel company still had 11,000 tons of material placed last year for shipment to an automobile company.

While this "low price" tonnage by now has been fairly well worked off, evidently it has not been consumed in sufficient volume to necessitate further commitments, and some observers believe one more steel buy will serve to fill requirements for the balance of 1939 model runs. Steel purchases so far this year have been practically all for fill-in needs and heavy tonnage buys, if they come out at all, should be released within the next few weeks. Only about three months of substan-

Clutch Assembly Speeded by Eliminating 32 Parts

■ One of the major changes made in the Buick 40 line this year was the adoption of a crown spring clutch, comprising only nine parts compared with 41 used previously. Here the clutch assemblies are in process, stacks of the crown spring members formed from special "cross-rolled" steel being shown on the bench

tial production remain for 1939 models, and material buying for this period necessarily will have to be concluded soon.

■ SUCCESS which Chrysler has been achieving with its Amola steel, now used in springs, gears and other parts, is indicated by the fact that last year approximately 200,000 tons of this material was rolled by the six companies licensed to produce it. Amola was perfected by C. Harold Wills, Chrysler metallurgist, and his staff is constantly at work seeking improvements in the steel. Slight changes are developed from time to time in analysis and treatment, and the application of Amola to a broader range of parts is foreseen.

Comparatively low cost and accompanying high physical qualities are reported to lend particular appeal to this steel analysis, which pays handsome dividends to Mr. Wills in the form of royalties, it is understood. Recently the steel has been supplied to a razor blade manufacturer and Chrysler divisions have been using the blades as souvenir promotion pieces in the sale of their cars. One million blades can be produced from a ton of steel, so not much Amola can be consumed in this field, but explorations are being made into the possibilities for its use in other metal products.

Researchers Busy

Of course, it is not likely other automobile manufacturers would adopt Amola steel for use in their cars, because of the competitive situation involved, but the General Motors research laboratories are said to be concluding experimental work leading toward the introduction of a similar type of steel which GM divisions could use in parts requiring high strength but where the cost of higher alloy steels cannot be met. No doubt the plan would be followed of licensing certain producers to supply the steel, with some arrangement being made whereby it would be identified as a General Motors development.

■ NATIONAL sales reports continue to reflect a bright picture in the retail movement of cars. Buick deliveries in the first ten days of March totaled 5598 units, an increase of 111.6 per cent over the same period a year ago, and 42.6 per cent ahead of the first ten days in February. Buick sales figures show the improvement pretty well distributed over the country. Percentage gains for various districts are as follows: Cleveland 141, Pittsburgh 174, Chicago 151, Cincinnati 235, Philadelphia 108, Denver 250, Milwaukee 439, Minneapolis 268, Atlanta, Ga., 244, El Paso, Tex., 178, Portland, Oreg., 105 and Seattle 277.

Pontiac retail sales in the same period aggregated 4017, up 60 per cent from a year ago and 35 per cent over February. Chevrolet figures for the same period showed sales of new cars and trucks totaled 23,477 units, a gain of 46 per cent over a year ago.

However, in the last week or so, reports are heard, at least locally, of softness developing in new car sales. Some dealers are dissatisfied with the failure of volume to register the improvement which had been anticipated. One group of dealers is "off the book" on used car trade allowances, which means that rigid adherence to book valuations on trade-ins has been abandoned in favor of "dickering" with the customer. This uneasiness may be only temporary and confined to this locality, or it may presage general weakness in the spring selling season. Certainly no tendency is being shown to boost stocks of new cars, production being held on even keel.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	*312,141
March	519,022	238,598	.....
April	553,281	238,133	.....
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,986	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Revised.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Feb. 25	75,660	56,977
March 4	78,705	54,440
March 11	84,095	57,438
March 18	86,725	57,555
March 25	89,400	56,800

†Comparable week.

	Week Ended Mar. 25	Mar. 18
General Motors	35,230	36,515
Chrysler	20,825	20,570
Ford	22,350	17,950
All others	10,995	11,690

■ SPECIFICATIONS can now be released on the new Studebaker Champion. Engine is 6-cylinder, L-head, with 3-inch bore and 3⅞-inch stroke, developing 78 horsepower at 4000 r.p.m. Head is cast iron, pistons are aluminum, connecting rods Timken DF steel. Intake valves are chrome-nickel steel; exhaust valves S.A.E. 2112. All springs are silicomanganese steel, transverse in front and semielliptic in the rear. Overall length of the car is 185⅝ inches; wheelbase 110 inches. Produced in custom and deluxe models, coupe, 2-door and 4-door sedans, overall weight of the latter is 2375 pounds.

The Studebaker plant is now turning out around 2000 cars weekly, a large share of which is the new Champion series.

Cancellation of the Packard program worked considerable hardship on some local suppliers, especially in the tool and die field. A few weeks ago these shops had so much Packard work scheduled they were unable to bid on other programs then up for consideration. Now that the Packard project has been shelved, these interests are in a position to take on other work but in the meantime this has been placed elsewhere.

A "what's wrong" clinic will be the feature of the twenty-second annual convention of the National Automobile Dealers association in San Francisco, April 17-20. What's wrong with factory practices? What's wrong with dealer practices? What's wrong because of outside influences? What's wrong in metropolitan areas? And what's to be done about it? These are a few of the questions which dealers will attempt to answer.

Graphite in Plastics

Use of pure graphite to make plastics completely opaque has been made possible through the development of a new form of colloidal graphite by Acheson Colloids Corp., Port Huron, Mich. In this form the graphite has such small particle size that it will stay in suspension in many low viscosity, volatile fluids miscible with plastics.

Plymouth has greeted spring with the first convertible sedan model ever built by this producer. It features an improved system of hinged supports with concealed side arms which swing in a horizontal plane to simplify the manual raising or lowering of the top, a "double" frame for extra strength, 117-inch wheelbase, and several special accessories.

Industrial employment in Toledo, O., at midmonth reached a new peak for the year, 51 plants reporting 15,951 men employed. Gain is accounted for largely by improved releases from automotive plants.

Slowdown in a Fisher Body plant at Flint, Mich., by a group of workmen who were disgruntled over the installation of new equipment which reduced a working crew from seven to six men led to brief interruption of operations at this plant and also at Buick early last week.

When you need **COLD FINISHED STEEL** in a hurry—look up your *J & L distributor* in the classified telephone directory

When you need Cold Finished Steel quickly—and when you want to be sure of uniform high quality steel exactly suited to your needs, call your J & L distributor. He is now listed in the classified telephone directories of important trading center cities, under—

Steel

JONES & LAUGHLIN COLD FINISHED

Rounds, Squares, Hexagons, Flats, in S. A. E. Carbon Grades. J & L Improved Bessemer Screw Stock. Jalcase Steel. Also Shafting (Turned and Ground, Turned and Polished, Cold Drawn).

J&L STEEL

"WHERE TO BUY IT"
DISTRIBUTOR

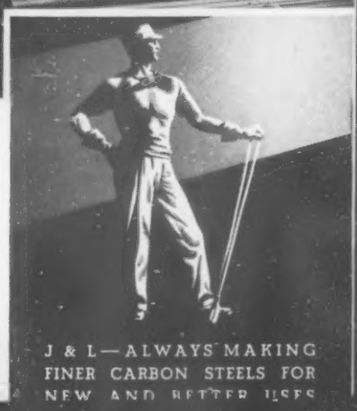
You will find him a mighty helpful man to do business with—reliable, progressive and ready to give you the kind of prompt, intelligent service that helps you make more money out of your own shop.

Furthermore, he represents the oldest manufacturer of Cold Finished Steel in the country, Jones & Laughlin—who has spent many decades in developing steels which give you better machining qualities—finer heat-treating properties—and greater workability.

Whatever your Cold Finished Steel needs are—your J & L distributor has the right grade and size in stock and will fill your order promptly. Remember where to find him. In the classified telephone directory . . . listed under *Steel* . . . give him a call for quick action.

J & L DISTRIBUTORS
carry these J & L Cold Finished Steel Products

Jalcase Steel . . . J & L Improved Bessemer Screw Stock . . . J & L Shafting in Cold Drawn, Turned and Polished, Turned and Ground . . . J & L Wide Cold Rolled Flats . . . Rounds, Squares, Hexagons, and Flats in all S. A. E. Carbon Grades.



J & L—ALWAYS MAKING FINER CARBON STEELS FOR NEW AND BETTER USES

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850

Activities of Steel Users, Makers

■ CONSOLIDATED Edison Co., New York, has awarded two boiler units of 65,000 kilowatts each, one to the Combustion Engineering Co. Inc., New York, and the other to Babcock & Wilcox Co., New York. Each unit will cost approximately $600,000. General Electric Co., Schenectady, N. Y., and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., each received an order for electrical equipment.

♦

Crucible Steel Co. of America, New York, has been licensed to manufacture Ledloy under Inland Steel Co. patents.

♦

Ferro Enamel Corp., Cleveland, has booked a contract from Gaffers & Sattler, Irvington, Calif., for erection of a porcelain enameling furnace.

♦

Taylor-Wilson Mfg. Co., McKees Rocks, Pa., has acquired the exclusive manufacturing and licensing rights to the Egler method of producing ingots.

♦

Prentiss-Wabers Co., Wisconsin Rapids, Wis., maker of stoves and other sheet metal products, has taken active management of the American Gas Machine Co., Albert Lea, Minn. Under the joint ownership, parts needed in the assembly of Prentiss-Wabers stoves, now obtained elsewhere, will be fabricated in the Minnesota factory. Ralph S. Wiltrout is general manager of Prentiss-Wabers.

♦

Safway Steel Scaffolds Co., Milwaukee, has opened a branch office at 942 South Park street, Madison, Wis., with G. R. Marsden in charge.

♦

Caterpillar Tractor Co., Peoria, Ill., has been elected to membership in the Association of National Advertisers Inc., New York, and will be represented by Gerald M. Walker.

♦

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Beckwith Machinery Co., Pittsburgh, to handle its line of excavating machinery in the Pittsburgh area, and Gulf Tractor & Equipment Co., Houston, Tex., its representative in that territory.

♦

Manufacturing plant and laboratories of the Alrose Chemical Co. and Mark Weisberg Laboratories have been moved from Providence, R. I., to 180 Mill street, Cranston, R. I.

♦

Chase Welding Supply Co., Benton, Ill., has been appointed representative for oxygen and acetylene welding and cutting apparatus and supplies in southern Illinois by Air Reduction Sales Co., New York.

♦

S. F. Bowser Co., Fort Wayne, Ind., has acquired the plant of the American Liquid Meter Co., Alhambra, Calif. The plant produces high-pressure liquid meters, and the Bowser company will enlarge and equip it also as an assembly plant for other Bowser products.

♦

H. K. Porter Co., Pittsburgh, has received an order from Havana Terminal Railroad Co. for five locomotive replacement boilers equipped with Nicholson thermic syphons and superheaters.

♦

Newport News Shipbuilding & Dry Dock Co. has ordered for its yard at Newport News, Va., two type C-20 electric tower whirler cranes from Dravo Corp., Neville Island, Pittsburgh.

♦

Independent Air Filter Co., Chicago, has announced discontinuance of its business. Arrangements have been made to complete all outstanding orders and continue indefinitely service to customers having Independent equipment.

♦

Ransome Concrete Machinery Co., Dunellen, N. J., has appointed W. J. White Co., 7310 Woodward avenue, Detroit, representative to handle its new welding table and positioner in southern Michigan.

♦

Reliance Steel Corp., a distributor with warehouses in Cleveland, Detroit, Chicago, Philadelphia, Toledo, O., and Worcester, Mass., has leased a warehouse in Lyndhurst, N. J., to facilitate distribution in northern New Jersey.

♦

Lincoln Electric Co., Cleveland, has established a factory branch office, with warehouse, at 1914 Utah avenue, Seattle. J. B. McCormick, who formerly represented the company in Fresno, Calif., and recently in Spokane, Wash., will be in charge.

♦

Julio F. Sorzano, industrial sales manager, Wailes Dove-Hermiston Corp., New York, has appointed the following as distributors of bitumastic protective coatings: Brance-Krachy Co., Houston, Tex.; R. W. Hudgins & Son, Norfolk, Va.; James Walker Co., Baltimore; Industries Supply Co., San Diego, Calif.

♦

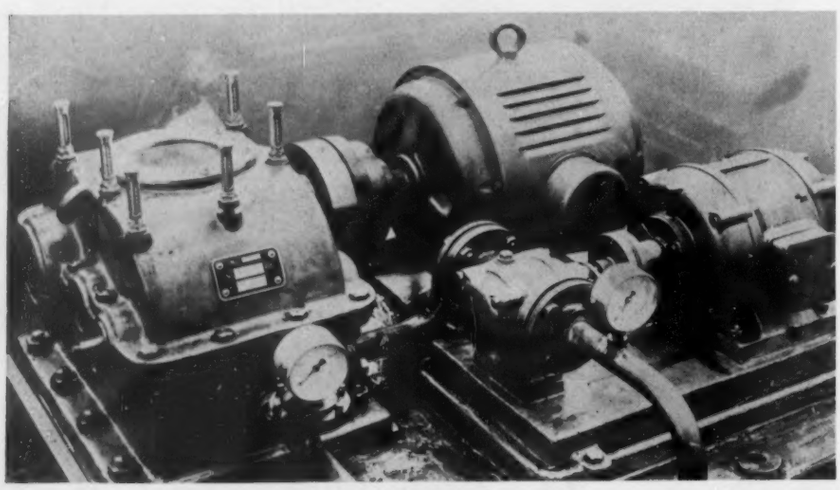
L. A. Young Spring & Wire Corp., Detroit, will move its mattress spring manufacturing division to a new one-story building with floor space 113 x 300 feet, in the Clearing industrial district, Chicago, April 1. The company already is located in the Clearing district and manufactures automobile seat springs and wire coat hangers.

♦

Lancaster Iron Works Inc., has consolidated its engineering, research and development activities at its new research laboratories, 85

(*Please turn to Page* 96)

Report Gear Drive Develops 100,000 R.P.M.



■ **Exhibited recently at the fair in Leipzig, Germany, this two-step gear drive developed 100,000 revolutions per minute, claimed to be the fastest in the world for equipment of this size. Prior records of similar speeds were made with much lighter devices, usually through compressed air acting directly on centrifugal rotors. NEA photo**

MEETINGS

FOUR GATHERINGS ON WIRE ASSOCIATION 1939 PROGRAM

■ THREE regional meetings and the annual meeting are included in activities of the Wire association for 1939. The regional meeting dates are as follows: April 5 at the Waldorf Astoria hotel, New York; April 25 at Hotel Bancroft, Worcester, Mass.; and May 5 at the William Penn hotel, Pittsburgh. The annual meeting will take place Oct. 23-27, at the Congress hotel, Chicago, in connection with the National Metal congress and exposition.

The New York meeting will provide an inspection of the signal section, army base, Brooklyn, and a national industrial preparedness dinner. Featuring the Worcester meeting will be an inspection of the plant of the Norton Co., and a dinner with C. G. Johnson, assistant professor of mechanical engineering, Worcester Polytechnic institute, speaking on "Trouble Shooting with Metallography." Program for the Pittsburgh meeting is not complete, although it will embrace a visit to the East Pittsburgh plant of Westinghouse Electric & Mfg. Co.

In memory of the late John Mordica, first president of the association, a Mordica memorial lecture has been established to give recognition to individuals who have performed outstanding work in the wire industry. First lecture will be presented at the annual meeting in Chicago.

Effective April 15, the Wire association will move its headquarters from 17 East Forty-second street, New York, to the Stamford Trust Co. building, 300 Main street, Stamford, Conn. Richard E. Brown is executive secretary.

ANNUAL MEETING OF GRAY IRON FOUNDERS IN MAY

Gray Iron Founders' Society Inc. will conduct its annual meeting at the Netherland-Plaza hotel, Cincinnati, May 15. All executives of gray iron foundries are invited to attend. W. W. Rose, 33 Public Square building, Cleveland, is executive vice president.

MANAGEMENT GROUPS PLAN MARKETING CONFERENCE

American Management association will conduct a marketing conference at the Hotel Commodore, New York, April 12-13, under joint sponsorship of the association's consumer and industrial marketing divisions. Purpose of the conference will be to improve departmental co-ordination and to suggest means of making a well-knit sales organization out of the entire management family in every company.

Among topics to be discussed are: "Problems Arising in Sale of Engineering Services"; "Creating and Maintaining Sales Effectiveness"; "Can Advertising Results Be Scientifically Determined?"; "Sales Controls"; "Psychological Factors in Selection of Salesmen"; and "Selection and Training of Salesmen."

Alvin E. Dodd, 330 West Forty-second street, New York, is president of the association.

TOOL BUILDERS' PRESIDENT WILL ADDRESS GAS GROUP

Wendell E. Whipp, president, Monarch Machine Tool Co., Sydney, O., and president, National Machine Tool Builders' association, will be featured speaker at a luncheon on the opening day of the industrial gas sales conference at Hotel Statler, Cleveland, April 27-28, under sponsorship of the industrial gas section, American Gas association.

The conference, scheduling technical sessions morning and afternoon of the two days, features 12 papers and five panel discussions.

REINFORCING INSTITUTE TO MEET IN AUGUSTA

Concrete Reinforcing Steel institute announces its fifteenth annual meeting at the Forest Hills hotel, Augusta, Ga., April 20-21. The program, details of which are now being arranged, will include an afternoon session on the first day, morning session on the second, and annual golf tournament in the afternoon. Mark Beeman, Builders building, Chicago, is executive secretary.

HEATING, VENTILATING MEN CHOOSE MACKINAC ISLAND

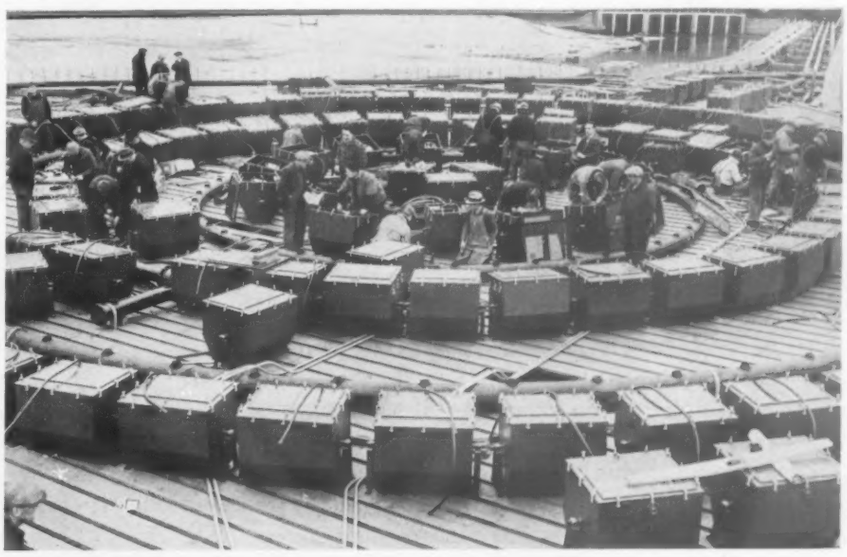
Semiannual meeting of the American Society of Heating and Ventilating Engineers will be held at Mackinac Island, Mich., July 4-6, with the Michigan and Western Michigan chapters as hosts. The convention will be designated as the Great Lakes summer meeting. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

MACHINE TOOL DEALERS TO CONVENE IN SCHENECTADY

Schenectady, N. Y., has been selected by the Associated Machine Tool Dealers of America for its spring meeting, June 5-6. Headquarters will be at the Van Curler hotel. This will be the first time the group has met in this city. The program, now being arranged, will include several outstanding speakers and some interesting inspection trips. Thomas A. Fernley Jr., 505 Arch street, Philadelphia, is executive secretary.

■ Building permits in 166 Illinois cities during February totaled 933; aggregate value, $5,952,613. In February a year ago there were 1092 permits, value $3,575,836.

Steel Drums Underwater To Light Fair Fountain



■ **Nearly two miles of single bead arc weld is used to fabricate the 585 submarine color drums which will provide lighting effects in the "Lagoon of Nations" fountain at the New York World's fair. Each will contain a 400-watt mercury arc lamp and a 1500-watt mazda lamp, over which will revolve hexagonal frames carrying color filters. Waterproof housings are 12-gage sheet steel, 40 inches long, 30 inches wide and 31 inches high. Units are being built by Westinghouse Electric & Mfg. Co. at its Cleveland lighting division**

Editorial

Unemployment and the Machine—and Profit

■ MACHINES, instead of destroying employment, create it on a large scale by their ability to lower costs. Such is the preliminary finding of the American Society of Tool Engineers' committee for investigating the effects of mechanization on employment and social conditions. The study covered a wide range of manufactured products, such as tin cans, automobiles, electric refrigerators and many others which, through development of machinery, now can be sold at prices which permit their wide enjoyment.

This story already is well understood and appreciated in industry, so that the main interest lies in the committee's conclusions as to the principal adverse factors that now minimize the machine's effect in reducing costs. The first is that of taxation. The cost of government is rising rapidly, and tax collections of federal, state and local governments now equal about 17 per cent of the national income, says the committee. It sets forth the estimate that today's taxes, hidden and open, amount to $377 a year per family, approximately double the tax load in 1929.

Machines Give Best Service Under Conditions that Promise a Profit

The committee also regards the more widespread employment of women in industry, and the comparatively high cost of distribution as factors that help to counterbalance the machine's contribution in bringing down costs. It also believes that mechanization frequently causes grave dislocations and that industry has neglected the men who are displaced by machines. It holds that plans calling for the introduction of new machines or new processes should include provision for the workers who will be displaced and forced to find new jobs.

There can be no quarrel with the committee's basic findings. For the American standard of living is the direct product of continued technological improvement in machinery and methods. At the same time, it is essential to bear in mind that machines, in the past, have made their maximum contributions to our enjoyment of life under conditions when men were given every encouragement to put these machines to work in the hope of earning a profit from the money invested in them.

It is only when unemployment becomes a problem that the machine goes on trial as the cause of this condition. The study of the effects of mechanization on employment and social conditions is merely a sign of the times. When business is good and good wages and profits are to be earned nobody looks askance at the machine. Then there is little or no unemployment because huge numbers of men and women are needed to operate machines to produce goods that are wanted.

Under the Right Conditions Mechanization Increases Employment

So the study of the effects of mechanization on employment and social conditions comes right back to the question: Why hasn't business improved so that a job can be provided for substantially every man and woman able and willing to work in producing the huge volume of manufactured products which the American public desires but cannot afford to buy?

To this problem STEEL has devoted many editorials and many articles, notably those which appear in its Forum on Re-Employment (see page 38). In every approach it eventually becomes evident that the vital necessity is to encourage employers to put more machines to work and to encourage more men to become employers, and that this result, in a democratic country, can come about only by encouraging industrial enterprise through the profit motive.

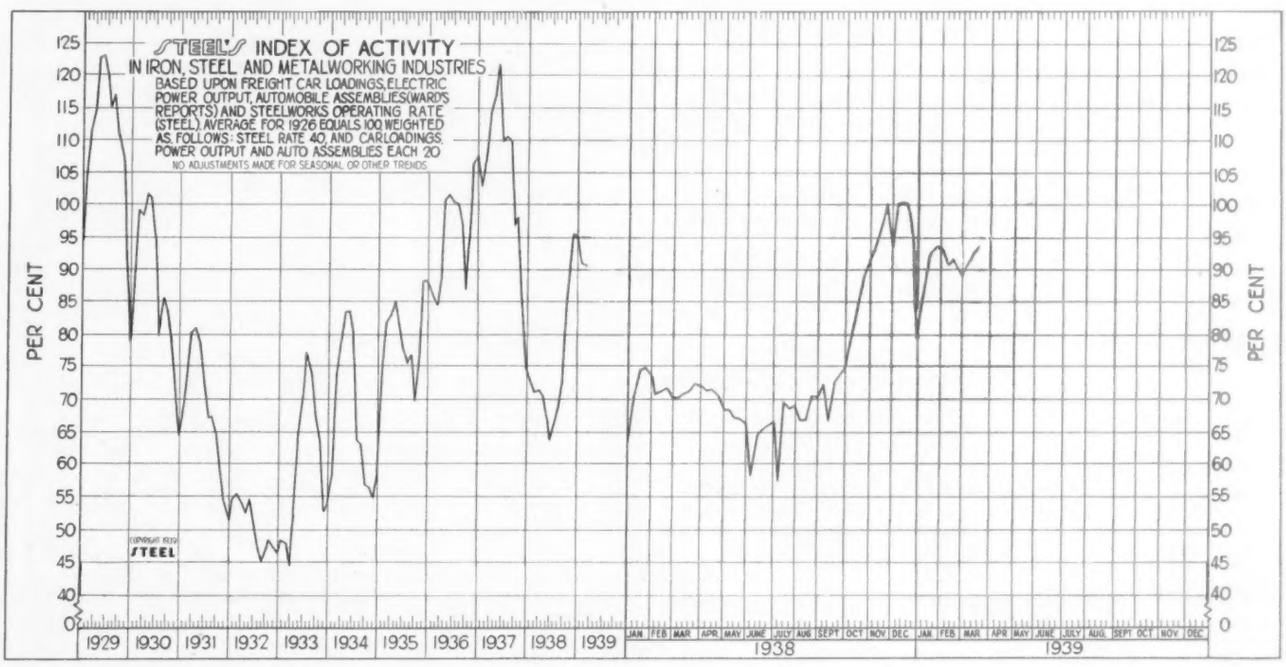
The BUSINESS TREND

Activity Index Reflects Seasonal Improvement

■ INDUSTRIAL activity in the iron, steel and metalworking industries as recorded by STEEL's index continued to move slightly upward in the week ended March 18. The index now stands at 93.3, an increase of 0.6 point over the preceding week. This represents the third consecutive weekly increase, the longest sustained advance since the turn of the year. The current level of activity recorded by the index is 63.4 per cent above the 1938 low. About 54 per cent of the total loss incurred during the last half of 1937 and the first six months of last year has been regained.

An encouraging factor in the current business situation is the increase in automobile production during the past few weeks. Automobile assemblies in the week ended March 18 were 86,725 units, against 84,095 in the previous week and remained well above the 57,555 units assembled in the same week last year. Since the low point this year in automobile production of 75,660 units, recorded during the week ended Feb. 25, assemblies have increased each week on an average of approximately 4000 units. The present seasonal upward trend in motor car output is expected to continue through the next 30 days at least, but perhaps at a somewhat slower pace.

Steelmaking operations remained unchanged during the week ended March 18 at 56.5 per cent. A year


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100. WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity gained 0.6 points to 93.3 per cent in the week ended March 18:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
	1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14	91.9	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2
Jan. 21	93.0	74.7	104.0	86.0	78.1	60.9	49.8	55.8	72.9	96.3	107.5
Jan. 28	92.9	73.8	99.6	86.5	79.5	62.3	50.8	56.2	72.9	97.4	109.8
Feb. 4	90.7	70.9	100.8	83.8	81.8	66.9	49.9	56.0	74.9	100.8	111.3
Feb. 11	92.1	71.2	101.9	85.9	82.7	70.7	48.7	55.5	75.4	100.9	111.7
Feb. 18	91.1	71.9	108.8	81.8	82.8	72.4	48.3	54.5	76.0	97.7	112.6
Feb. 25	89.3	70.3	112.8	83.4	80.5	75.5	46.0	55.1	75.8	99.7	109.2
Mar. 4	91.5	70.1	117.9	87.7	81.1	76.8	47.4	54.1	79.2	98.3	113.5
Mar. 11	92.7	70.8	112.7	89.7	82.0	78.6	43.4	54.8	80.6	97.5	114.8
Mar. 18	93.3	71.3	113.1	86.0	84.0	79.9	42.7	54.4	81.3	98.1	115.0

ago the national steel rate stood at 32 per cent. Steelworks operations have fluctuated only slightly since the first of the year, as indicated by the spread between the high and the low point of only five points since the week ended Jan. 7. Little, if any, variation in the steel rate is anticipated through the next few weeks. However, seasonal influences should take hold more positively during the latter part of April.

Revenue freight carloadings gained slightly more than seasonally during the week ended March 18. Freight traffic in that week of 594,568 cars compares with 591,691 in the preceding week and 540,332 in the comparable week in 1938.

The lone business indicator composing STEEL's index not to record a gain during the week ended March 18 was electric power consumption. Power output in that week recorded a seasonal decline to 2,225,486,000 kilowatt-hours. This represents the seventh consecutive weekly decline in this industrial indicator. A year ago electric power consumption was placed at 2,017,653,000 kilowatt-hours.

An indication of the strength of the demand for machine tools during February was illustrated in the National Machine Tool Builders' association index for the month. Domestic orders gained ground once more over foreign business, the latter holding around the same level as for the last six months. An increase in orders during February, normally a seasonally low month, forced the association's order index to a new high for this year of 167.1. The three-month moving average index also touched a new high for the current year of 154.8. This represents a gain of 18.3 points over the preceding month and remains well above the index figure of 112.3 reported in the comparable month last year.

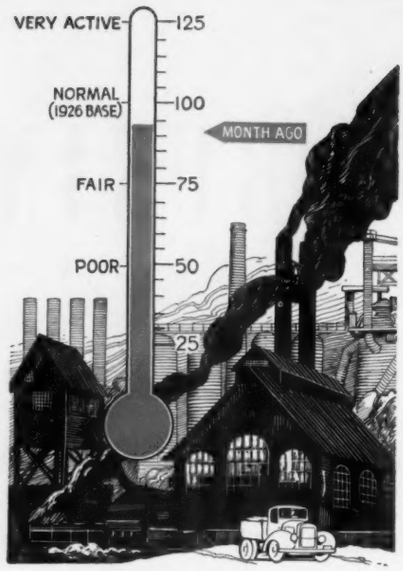
A sharp rise in foundry equipment orders also developed during February. Excluding December of last year, the index of the Foundry Equipment Manufacturers' association advanced to the highest point since October, 1937. Net orders for February were indexed at 135.3, against 122.3 in January and 90.4 in February, 1938. Shipments also rose, lifting the index for February to 112.2 from the January level of 96.3. Unfilled orders climbed to an index figure of 175.1 from 151.4 in January.

To what extent the European situation may disrupt the anticipated seasonal improvement in domestic industrial activity remains to be seen.

Industrial Weather

TREND:

Unchanged



Where Business Stands

Monthly Averages, 1938 = 100

	Feb., 1939	Jan., 1939	Feb., 1938
Steel Ingot Output	136.2	135.5	78.5
Pig Iron Output	142.1	136.2	137.9
Freight Movement	100.1	100.3	72.0
Automobile Production	*142.3	166.3	91.5
Wholesale Prices	97.6	97.7	101.5

*Preliminary.

The Barometer of Business

Industrial Indicators

	Feb., 1939	Jan., 1939	Feb., 1938
Pig iron output (daily average, tons)	73,543	70,175	71,378
Machine tool index	154.8	136.5	112.3
Foundry equipment new order index	135.3	122.3	90.4
Finished steel shipments	677,994	789,305	474,723
Ingot output (daily average, tons)	123,120	122,571	70,969
Automobile output	*315,000	353,946	202,589
Coal output, tons	33,910,000	35,530,000	27,440,000
Business failures; number	963	1,263	1,149
Business failures; liabilities	12,788	19,122	21,028
Nat'l Ind. Conf. board (25 industries) av. weekly hr. per worker in factory	† 36.6	36.6	32.5
Factory av. wkly. earn'gs	†$25.95	$26.02	$22.98
Cement production, bbls.	5,506,000	5,301,000	3,916,000
Cotton consumption, bales	.....	592,000	428,000
Car loadings (weekly av.)	574,347	574,616	413,090

*Preliminary.
†January, December and January, respectively.

Foreign Trade

	Feb., 1939	Jan., 1939	Feb., 1938
Exports	.....	$212,908,000	$262,733,000
Imports	.....	$178,201,000	$163,085,000
Gold exports	.....	$81,000	$174,000
Gold imports	.....	$156,427,000	$8,211,000

Financial Indicators

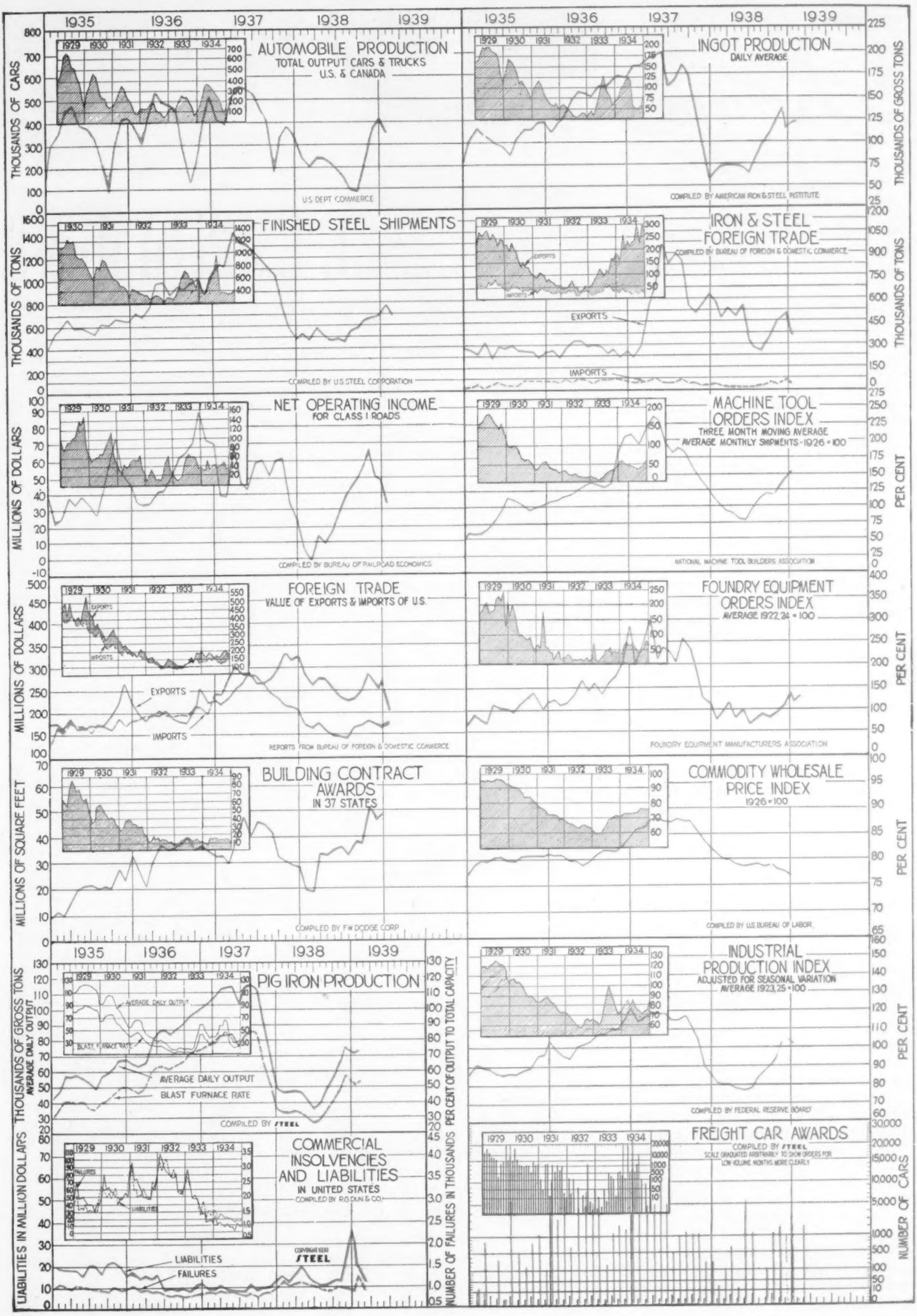
	Feb., 1939	Jan., 1939	Feb., 1938
25 Industrial stocks	$175.01	$181.82	$155.86
25 Rail stocks	$23.59	$23.64	$22.19
40 Bonds	$72.56	$71.69	$71.08
Bank clear'gs (000 omitted)	.....	$23,187,000	$17,584,000
Commercial paper rate, New York (per cent)	½–⅝	½–⅝	1
*Com'l loans (000 omitted)	$8,186,000	$8,233,000	$8,896,000
Federal Reserve ratio (per cent)	84.2	83.9	80.4
Capital flotations:			
Refunding	$163,173,000	$ 56,559,000	$117,116,000
New capital	$37,500,000	$219,658,000	$ 82,072,000
Federal gross debt (mil. of dol.)	$39,859	$39,631	$37,636
Railroad earnings	†$32,890,711	$49,373,177	$7,144,036
Stock sales, New York stock exchange	13,876,813	25,185,780	14,524,824
Bond sales, par value	$119,402,725	$159,507,350	$127,700,475

*Leading member banks Federal Reserve System.
†January, December and January, respectively.

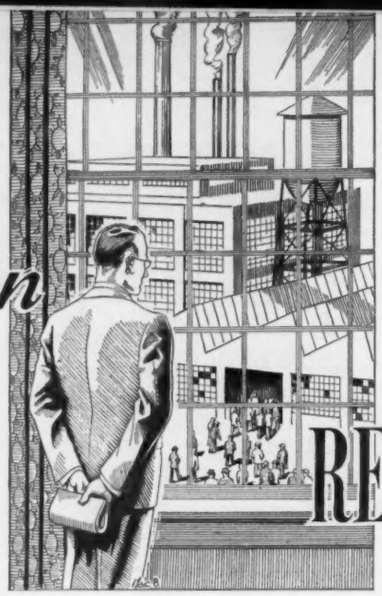
Commodity Prices

	Feb., 1939	Jan., 1939	Feb., 1938
STEEL'S composite average of 25 iron and steel prices	$36.37	$36.36	$28.90
U. S. bureau of labor's index	*76.7	76.8	79.8
Wheat, cash (bushel)	$0.87	$0.87	$1.11
Corn, cash (bushel)	$0.64	$0.66	$0.74

*Preliminary.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
MILLIONS OF SQUARE FEET
LIABILITIES IN MILLION DOLLARS
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
PER CENT
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ OUR CONTRIBUTOR this week takes the stand that inasmuch as business is faced with conditions which are beyond the control of any individual concern, the thing to do is not to brood over the situation but to meet it boldly and constructively—just as any other form of competition would be met.

Coming from Henry Buker, vice president of the Brown & Sharpe Mfg. Co., Providence, R. I., this advice is more than ordinarily impressive. It has been in just that spirit that his company has successfully weathered economic difficulties for considerably more than a hundred years, and during 47 of those years Mr. Buker has been with that company. He was sales manager for a number of years before being elected a vice president in 1924.

Mr. Buker says: "Practically all manufacturers of machinery have competitors over whom they have no control, and they must face the problem of selling their products in spite of the competition that they meet. If we are courageous, we do not say to ourselves: 'It is hopeless for us to carry on when our competitor sells his product at a lower price than ours or uses some other method that seems detrimental to our business.' If we are keen and alert, we redouble our efforts in trying to convince our prospective customers of the merits of our machines. We do this through our salesmen or through advertising."

—The Editors

■ A GREAT DEAL of emphasis has been placed on the fact that our government in Washington has been largely responsible for the depression because of the various laws that have been passed affecting capital, hours of labor, and other restrictions which bear very heavily on all lines of business. While this is true in a large measure, the question naturally arises as to what we can do about it, as most of the problems seem to be beyond the control of any individual person or concern.

Practically all manufacturers of machinery have competitors over whom they have no control, and they must face the problem of selling their product in spite of the competition that they meet. If we are courageous, we do not say to ourselves: "It is hopeless for us to carry on when our competitor sells his product at a lower price than ours or uses some other method that seems detrimental to our business." If we are keen and alert, we redouble our efforts in trying to convince our prospective customers of the merits of our machines. We do this through our salesmen or through advertising. If we find that a competitor has certain features the trade desires, we try, as far as possible (provided we think such features are correct mechanically) to see that our product is brought in line with the times, and we continue to use every effort to get what we believe to be our share of the business.

Now it is evident from reports we receive that the majority of manufacturers believe that the government is their greatest competitor and that the fact that they are not employing more men is due to the various restrictions the government has placed on doing business. If this is true, what can be done about it?

Meeting Government Competition

It seems to me they should follow the same principles in dealing with the government that they use in dealing with other commercial competitors. Through good advertising and good salesmanship, which can be carried out through various organizations, they can try: First, to educate congressmen and senators now in Washington to a more sane way of looking at their problems; second, they can use their influence as far as possible in the future to see that only the right kind of men are elected to represent them. That this will be a slow process I appreciate, but it has also been a slow process to build up a business—as in our own case and in the cases of many other manufacturers. So if Washington is standing in the way and is responsible to a large degree for unemployment, it seems that we should all do everything we can to educate those who represent us there so that they can and will help us and thus help solve the unemployment problem.

While we can blame our government for many of the faults of our present condition, yet there are other problems which the government cannot solve by itself. I once asked an intelligent farmer what the government could do to help the farmer. His answer came very promptly: "The government cannot help the farmer until the farmer

learns to help himself." I think there is a great deal of truth in that statement and it applies not only to farmers but to many other types of industry.

Some people have felt that the way back to prosperity lies in making radical reductions in the prices of products that they buy. This may be and probably is true in some lines of work, especially in the building trades where the cost is so high that many people of moderate means who would like to have their own homes do not feel they can afford to build. I do not think this is true in mechanical lines. If, in 1932, the machine tool builders had cut their prices one-half, I doubt that they would have increased their business any appreciable amount, because their customers, in the majority of cases, were working at less than 25 per cent of their capacity, their bank accounts were dwindling and they had no assurance of future prosperity so that they did not feel like spending money even for bargains.

On the other hand, in many other lines of consumer products a reduction in price would and did stimulate buying with the result that merchants commenced to place orders with mills for dry goods and other articles consumed by the public. Eventually this demand reacted on all lines of business and more and more men were gradually employed. With proper government co-operation there would have been every reason for business to continue to grow. This is especially true in view of the orders that we have received from abroad which, added to a proper domestic demand, would have required more and more men to produce sufficient material to meet requirements.

Initiative a "Must"

Initiative means just as much to individuals as it does to companies when it comes to getting work at times when work is not easy to get. Take for example the case of two workmen who made the New England hurricane of last September an asset to themselves.

Noting that the guest house on one of the estates here in Providence had been demolished, they went to the owner with a rebuilding proposition which was so attractive that he accepted it. Their explanation for the attractive price was that they knew exactly how much the lumber would cost, that they were working for themselves and were not on public relief, and that they had figured the thing out so that they would make even more on it than their usual hourly pay. They were right—it actually did work out that way.

This demonstrates that capable workmen who are not hampered by trade restrictions often can obtain work entirely through their own initiative. Incidentally, when such men are working for themselves, they make everything count.

Henry Buker
Vice President
Brown & Sharpe Mfg. Co.
Providence, R. I.

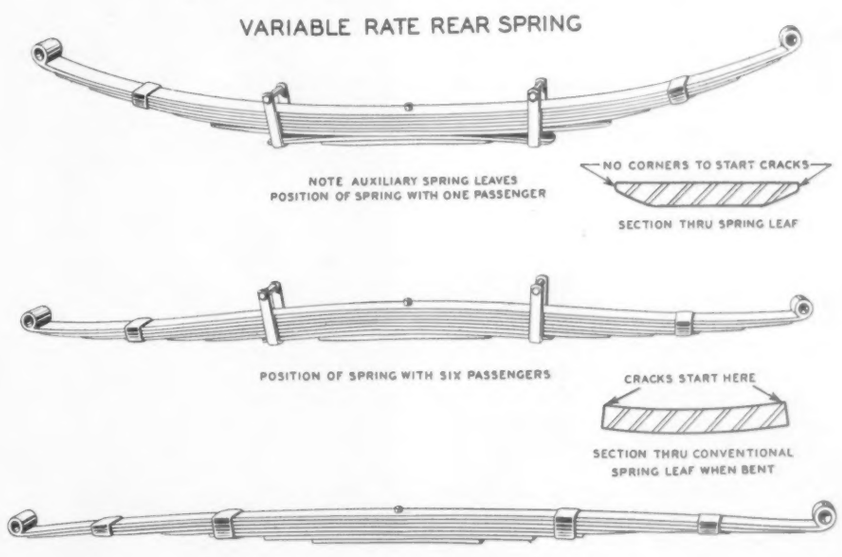
Third Foundry Meeting at Massachusetts Institute

■ Third regional foundry conference under joint sponsorship of the American Foundrymen's association, New England Foundrymen's association and Massachusetts Institute of Technology, will be held at the institute in Cambridge, Mass., April 14-15. Sessions will be devoted to personnel problems, spectroscopy, high test cast irons, sands, pressure bronze castings, and core room practice.

Technical papers include: "Personnel Problems of the Modern Industrialist," by J. E. Doyle, director, division of unemployment compensation, Commonwealth of Massachusetts; "Applications of Spectroscopy to Foundry Problems," by Dr. G. R. Harrison, professor of physics, Massachusetts Institute of Technology; "Recent Developments in High Test Cast Iron," by J. S. Vanick, research metallurgist, International Nickel Co. Inc., New York; "Production of Pressure Bronze Castings," by D. F. O'Connor, foreman of brass foundry, Walworth Co., South Boston, Mass.; and "Variable in the Coreroom, Their Treatment and Cure," by L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland.

Speakers at the dinner on April 14 will be: E. L. Moreland, dean of engineering, Massachusetts Institute of Technology; H. S. Washburn, president, Plainville Casting Co., Plainville, Conn., and vice president, American Foundrymen's association; and W. F. Piper, secretary-treasurer, Beardsley & Piper Co., Chicago.

Improved Springs Resist Deflection


VARIABLE RATE REAR SPRING
NOTE AUXILIARY SPRING LEAVES
POSITION OF SPRING WITH ONE PASSENGER
NO CORNERS TO START CRACKS
SECTION THRU SPRING LEAF
POSITION OF SPRING WITH SIX PASSENGERS
CRACKS START HERE
SECTION THRU CONVENTIONAL SPRING LEAF WHEN BENT
1938 CONVENTIONAL REAR SPRING

■ An important improvement in the 1939 Pontiac model was the change from conventional rear leaf springs to the variable-rate spring shown at the top in the accompanying illustration. As the load on this new type spring is increased, resistance to deflection builds up smoothly because of gradual contact with the three lower auxiliary leaves, thus providing same oscillation with light or heavy loads. Note cross-section of the new design, which permits about 7 per cent reduction in weight with better resistance to fatigue failure

Gages used in the manufacture of motors at the plant of General Electric Co., West Lynn, Mass., are checked at frequent intervals by an expert who uses a set of Johannson blocks

Pride In

By GUY HUBBARD
Machine Tool Editor

■ ONE IMPRESSION gained through several days of the exposition and convention of the American Society of Tool Engineers in Detroit during the week of March 14, was that the spirit of this important group of technicians is much the same as that which animated the craftsmen who made up the influential guilds in olden times. Not only did these guilds foster pride in craftsmanship—including metalworking; they also bent their efforts toward making the world a better place in which to live.

Codes of ethics developed by the guilds have been handed down to the present day through certain fraternal organizations. By the same token, the skill and the pride in craftsmanship fostered by the guilds have been passed on through the years from master to apprentice —to become the valued heritage of tool engineers and toolmakers of our time.

The big difference betwen "yesterday" and "today" lies in the fact that the craftsmen of the guilds worked for the benefit only of a fortunate few, whereas the craftsmen of the modern toolroom work for the benefit of the entire population of the country. For example, Benventuto Cellini in the sixteenth century designed and made a few beautiful pieces of metalwork for a few wealthy and influential patrons. In our own twentieth century, a gifted industrial designer—with the help of a few tool engineers, toolmakers and die sinkers—can make available to untold thousands of people, things of beauty and of utility which are beyond the imagination of the great patrons of Cellini.

Interchangeable manufacturing, essentially a toolmaking development, is responsible for all this. While this system as we know it was founded by Eli Whitney at New Haven, Conn., about 1800, it did not fully demonstrate its possibilities until it was taken in hand by R. E. Olds, Henry M. Leland, Henry Ford and some other automotive pioneers in and around Detroit about a hundred years later. It is significant that while Whitney originally conceived the system for the mass production of military firearms, the subsequent trend of Amer-

Micrometer calipers—even those reading to "tenths"—are about as commonplace today throughout American industry as were 6-inch steel scales 50 years ago. This one is being used by a girl in connection with the manufacture of Westinghouse instruments

Craftsmanship

Is Powerful Factor

In Tool Engineering

ican genius was to swing it over to the arts of peace—"forging swords into plowshares," as it were.

In studying the many significant developments in the realm of tool engineering which were revealed at the recent Detroit exhibition, the following was brought forcefully to mind. The history of tool engineering in this country has been to a considerable degree the story of a race between "making methods" and "measuring methods." It can be compared perhaps to the race between armor plate and armament; between burglarproof safes and crackmen's tools; and between metals which must be cut and the metals which must cut them.

Little Precision in Early Days

At the beginning of the industrial era it was possible to measure much more closely than it was to make, even though a modern wooden yardstick is an instrument of precision compared to most of the standards of that day. Those were the days when one of James Watt's block tin steam engine cylinders 18 inches in diameter, when bored, was found to be ⅜-inch out of true.

With rapid developments in machine tools both in England and America during the first half of the nineteenth century, "making methods" rapidly caught up with "measuring methods." They appeared even to be outstripping them, until the micrometer caliper was made generally available through the efforts of Brown & Sharpe in the late 1860's.

By the early 1880's, "thousandths" and fractions thereof were in much more common use in the tool rooms of America than some people today realize. In 1884 the late George M. Bond, famous metrologist of the Pratt & Whitney Co. was able to say: "The arm of King Henry the first, or the barleycorn, though possibly furnishing a standard good enough at that time, would hardly satisfy the requirements of our modern mechanics or toolmakers, who work very often within the limit of a thousandth of an inch, and even *one-tenth* of this apparently minute quantity, with surprising unconcern and no less accuracy."

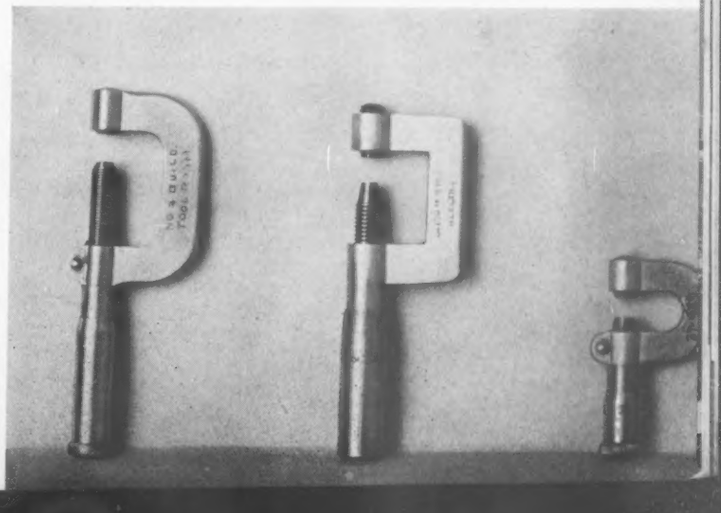
The situation today, as was clearly reflected at the tool show in Detroit, is that the "ability to make" and the "ability to measure" have both reached so far out into the realm of "millionths," that it is hard to say which—if either—is ahead of the other. As matters now stand, anything within the bounds of commercial limits can be made and likewise can be measured, at least so far as sizes are concerned. So fine have become the commercial limits, however, that a new factor—that of surface finish—has assumed new and almost startling importance.

When variations in size expressed in millionths of an inch began to assume commercial importance, the specification of surface finish had gotton beyond the old familiar "finish marks" and it also had gotten beyond the ordinary measuring instruments. Now that superfinish, fine grain grinding, and various systems of lapping are capable of producing surfaces that are almost molecular in their fineness, and now that the commercial possibilities of such surfaces are rapidly becoming appreciated, how can they be exactly specified, how can they be exactly measured, with what standards can they be compared?

Those questions are now getting the attention of some of the best brains in the tool engineering, tool building, instrument, and standardization fields. Various ingenious pieces of apparatus and methods were demonstrated, and a number of theories were advanced, in connection with the recent Detroit exposition and convention, which indicate that while there are several ingenious ways and means for measurement of surface quality, there apparently is yet to be general agreement on basic standards involved.

Pride and Skill Passed On

In a conversation with the writer since the Detroit show, James R. Weaver of the Westinghouse Electric & Mfg. Co., newly elected president of the A.S.T.E., expressed the following thought: "Tool engineers," he said, "have succeeded to a remarkable degree in transferring their skill and even some of their pride in craftsmanship to tools and machines. Unfortunately, however, it is not yet possible to depend upon these tools and machines in turn to inspire in their users and operators an equal amount of pride in craftsmanship." Here indeed is a most unusual kind of problem, but a solution certainly will be found, and that solution, I believe, is destined to be tremendously important in the further development of interchangeable manufacturing in the United States.



Micrometer evolution, instrument shown in center being that of Jean Laurent Palmer, seen by Joseph R. Brown and Lucian Sharpe at the Paris exposition in 1867. Others shown are early American instruments combining A. D. Laws and Palmer systems with improvements by Brown & Sharpe

PRIZE PACKAGES

Fig. 1

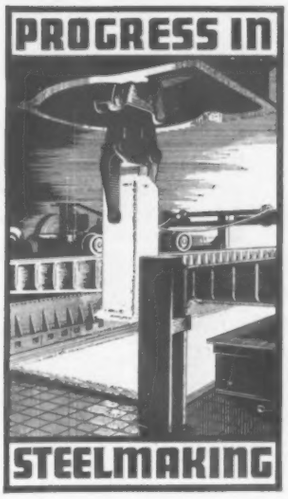
Fig. 2

Fig. 3

■ Brightly finished metal containers and display pieces were prominent among winners in the 1938 All-America package competition, results of which were announced March 1 by "Modern Packaging" magazine. Top honors in the counter display group were accorded lithographed stands, shown in Fig. 1, designed for Devoe & Reynolds Co., New York, to stimulate sales of water colors and pastels. Chrysler Corp.'s new series of cans for its hydraulic brake fluid, Fig. 2, carried off a prize in the metal container competition. Each size has the same color motif in red and gray except the largest, which has an all-over red top. Other winners in this group were a floor wax can, Fig. 3, designed by Ultra Chemical Works, Paterson, N. J., and realistically lithographed to represent tile type red-brown linoleum; and the tea bag canister, Fig. 4, decorated in a bright orange, green and white design by American Can Co., New York, for the use of McCormick & Co., Baltimore. A strong, all-metal, blue enameled, double-faced unit, Fig. 5, won first place for Waterbury Rope Co., Brooklyn, N. Y., in the floor display group. Each side carries four rows of rope in various sizes, three 100-foot reels to the row. It is headed by a metal display panel which carries a sales message and prices, making the display an actual selling medium

Fig. 4

Fig. 5



Adds 44" Blooming Mill

New blooming mill is driven by a 7000-horsepower, direct-current motor with half of pinion stand projecting through wall into motor room, due to tight quarters encountered. Located between mill and runout tables is a 300-ton shear

■ WHEN THE Steel Co. of Canada Ltd., Hamilton, Ont., decided to proceed with an expansion program, it carefully studied how to increase the output of semifinished steel for its widely diversified finishing mills and for future requirements as well. Besides adding to the steelmaking capacity and modernization of the soaking pits, it involved the installation of an up-to-date 44-inch blooming mill.

For about 24 years, all blooms had been rolled on a 34-inch, 2-high, reversing, blooming mill designed and built by United Engineering and Foundry Co., Pittsburgh. In tandem with this 34-inch bloomer is a 6-stand continuous sheet bar and billet mill.

The new 44-inch bloomer is located 190 feet from the 34-inch mill. To make room for this mill, four of the existing soaking pits had to be removed and four new ones installed adjacent to the remaining pits farthest from the mill.

New mill is a 2-high reversing type with rolls, 40 inches diameter by 96 inches barrel length. It is driven by a 7000-horsepower motor through a fully enclosed pinion stand of 44-inch pitch diameter. The roll housings rest on cast steel shoe plates, the pinion stand directly on the foundation. The mill spindles are of the universal type. Considerable ingenuity was required to build an up-to-date mill in the available space. Particularly limited was the distance from end of motor to the end of the roll stand.

It became necessary to place the pinion stand on the dividing line between mill building and motor house. Years ago mill operators would hardly have sanctioned such a location. Modern pinion stands, however, constitute such reliable units that no objection could be advanced to the meeting of existing conditions in this manner. A drag-link coupling of proved design couples the motor to the pinion-stand. Where space is at a premium and no misalignment need be considered, the coupling meets the requirements in the simplest possible manner.

All details of the mill are of unusually rugged design. Mill screws are 15 inches in diameter and are operated by two 150-horsepower motors. The screwdown mechanism is mounted throughout on roller bearings. The rolls as well as the top spindle are hydraulically balanced, a separate cylinder being provided for the spindle balance. This feature simplifies the foundation for the mill and adds greatly to the ease of aligning top roll and top spindle when changing rolls. The method of roll changing is interesting. Both rolls together with the roll neck bearing are pulled out simultaneously by an electric roll-changing rig. The track of this rig extends into the adjacent roll shop.

The steel plant is located close to the bay where clean, cool water is available. It was decided, therefore, to use phenolic rosin shells for the roll neck bearings. Excellent results have been obtained by using this material on the existing 34-inch mill. Phenolic material is used also for the slippers of the universal joints of the mill spindles.

Ingots, 20 x 20 inches and weighing 6400 pounds, had been the standard for the 34-inch mill. The standard ingot for the new mill is 25 x 27 inches and weighs about 17,000 pounds.

Reversing mill tables have rollers and lineshafts mounted on roller bearings. The roller journal bearings at the lineshaft side are double row, tapered. At the opposite end, cylindrical roller type are used to allow for expansion of the table rollers. The lineshafts are carried

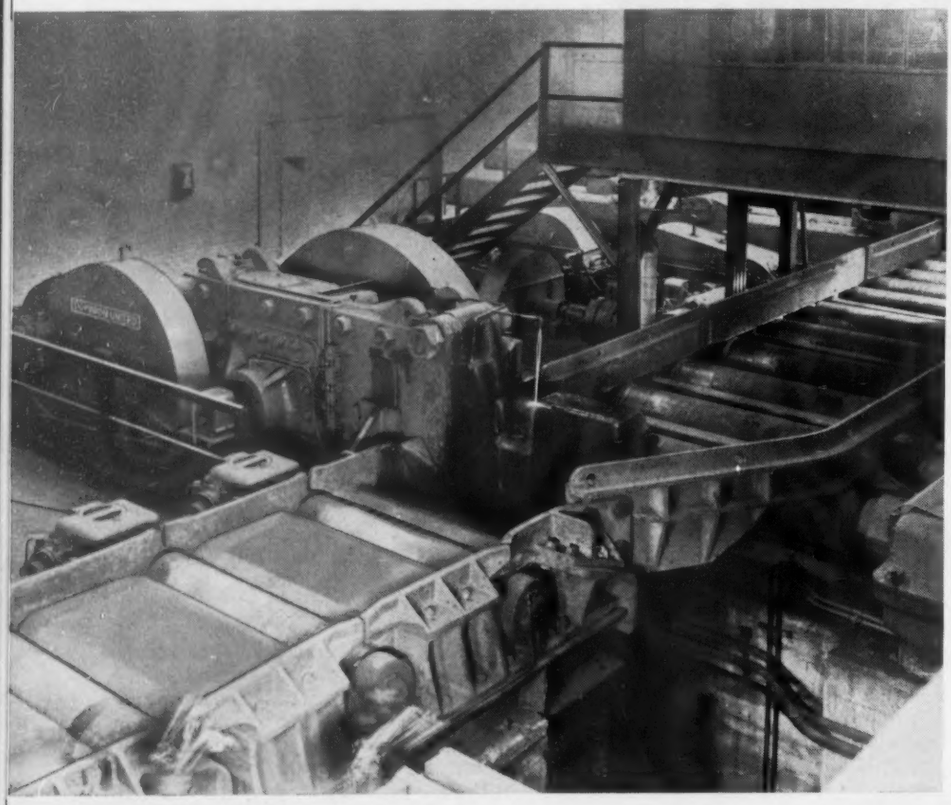
Fig. 1—View of the 44-inch blooming mill from the approach side. Photos courtesy Dominion Engineering Co. Ltd., Montreal, and United Engineering & Foundry Co., Pittsburgh

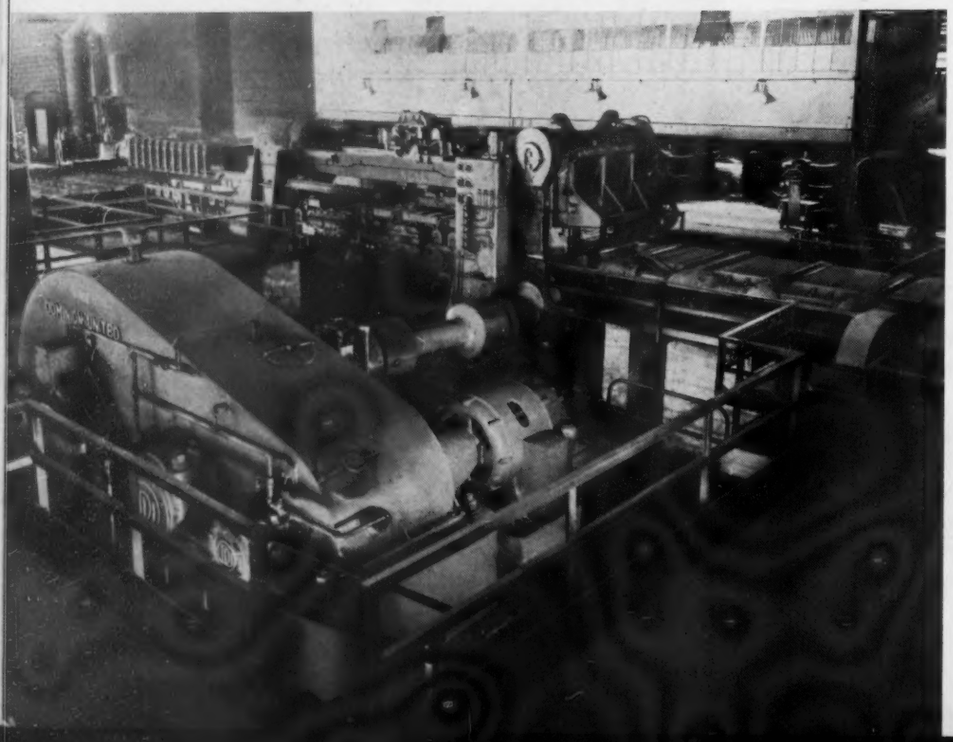
in cylindrical roller bearings. End thrust of the lineshaft is taken up by a thrust bearing at the end of the shaft. By removing a filler, the lineshaft can be moved endwise to put the bevel gears out of mesh for convenient removal of lineshaft or table rollers should this become necessary at any time. All gears and lineshafts are enclosed in an oil-tight trough which forms an integral part of the cast-steel table girders.

Ingots, blooms and slabs are handled on the front and back mill tables by an electric double manipulator. One side guard on the side farthest from the soaking pits is equipped with tilting fingers. Operator's pulpit is located on this side of the mill, so men have a view of the 34-inch mill, also. The manipulator is of the rack type with all driving mechanism on the spindle side of the mill. Racks and rack pinions have cut teeth. One rack is strong enough to take the full stalling torque of two 100-horsepower motors.

Racks are fastened to rolled steel rams between the table girders and outside of the table. They travel on forged steel rollers. These rollers turn in roller bearings. Ample provision is made to prevent intrusion of scale and dirt into these bearings which are mounted in square seat boxes. These in turn rest on spreaders between the table girders. Thus no bolts or keys have to be taken out for removal of the carrier rollers and boxes.

Care has been taken to guard against accumulation of scale. The side guard, which has the tilting fingers, and its corresponding guard at the entry side of the mill have sufficient over-travel to permit removal of table rollers without disturbing the manipulator. The motor-operated crankshaft drive for the tilting fingers is mounted on the foundation. In the design of this patented manipulator, all sliding surfaces have been avoided except for backing up the tilting fingers.





Redesign Ingot Buggy

A knotty problem which had to be solved was the design of the ingot buggy. The old buggy which had fed the 34-inch mill was made for an ingot of 20 x 20 inches maximum section and traveled over a track of 36-inch gage. Since two of the existing soaking pits were retained, also part of the soaking pit building, the buggy had to be made to travel over the existing track and clear existing furnaces and building columns. It had to transport, however, a future ingot almost three times as large as the old one. Here modern manufacturing methods came to the rescue. Welded construction was applied except for the ingot pot proper. Instead of the customary automatic tilting by cam and level, a motor-operated crank mounted on the buggy does the tilting. It is pleasing to see the gentle way in which the ingot lands on the table.

After the ingot has been rolled down enough to be received by the 34-inch mill, it is at times desirable to crop the ends before it is delivered to this mill. Whatever means was to be used for this purpose had to be such that it would not interfere with the free passage of future slabs from the 44-inch mill and permit a free runback during the last passes when small billets had to be rolled in the 34-inch mill.

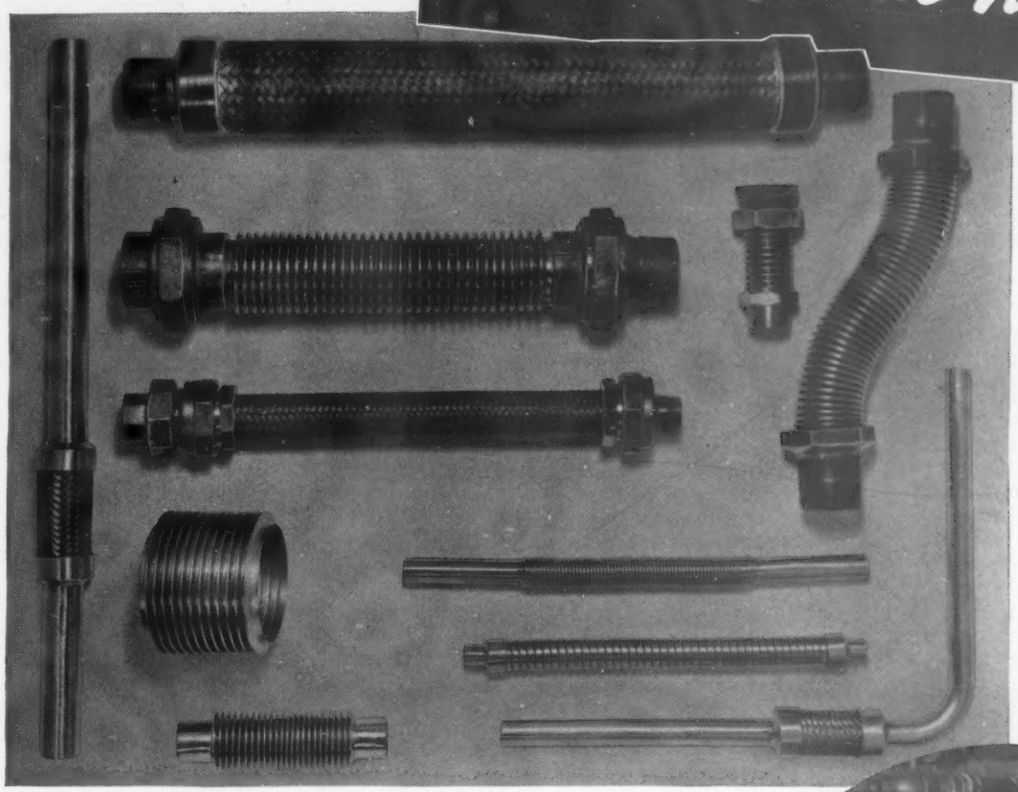
To meet this condition, a tilting horizontal shear was devised which is depressed below the top of the adjacent tables when inoperative. It is a clutchless machine with

(*Please turn to Page* 76)

Fig. 2. (Upper)—Closeup view of 300-ton cropping and dividing shear located between mill and runout tables. Fig. 3. (Lower)—Down and upcut shear and drive unit at Hamilton, Ont., plant of Steel Co. of Canada Ltd.

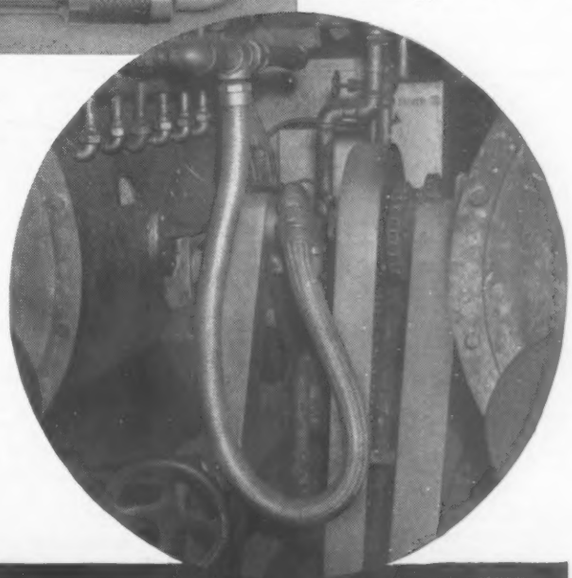
It's the toughest Tubing you can buy

American Seamless Flexible Metal Tubing



LEFT: *A few examples of special flexible tubing assemblies with fittings that we have designed for specific engineering requirements.*

BELOW: *Here's a 6-ft. length of 2" I. D. American Seamless Flexible Bronze Tubing conveying manufactured gas to a heat treating furnace.*



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Write us about your connector problems. Our engineering department has complete information on the use of American *Seamless* on all types of equipment. And ask for free reference handbook, *Catalog SS-25.*

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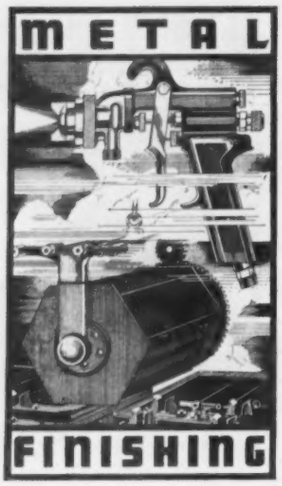

Base Metal Coloring

Iron and steel surfaces are colored by heat, chemical reactions and plating treatments to produce many useful finishes. Coloring of other metals by similar methods appears to offer many advantages, especially chemical coloring

Part II

BY DR. C. B. F. YOUNG*

■ IRON AND STEEL can be colored by heat treating, chemical treating and electroplating. Steel heated in the open air gives the following colors at the designated temperatures:

Table IV

Color	Degrees Fahr.
Pale yellow	420
Straw yellow	440
Brown	490
Purple	536
Pale blue	570
Dark blue	600

Salt baths are used instead of air for better temperature control. The color also is somewhat deeper. A representative bath contains equal parts of sodium and potassium nitrate with manganese dioxide added in a ratio of one part oxide to 50 parts of the nitrate mixture, used at a temperature of 600 to 650 degrees Fahr.

Chemical coloring of iron and steel parts is gaining ground. The coatings produced not only are attractive but also serve as protection against corrosion. Black colors can be produced as shown in Table V by immersing in solutions for 20 to 30 minutes.

Table V

Black on Steel—I

Sodium hydroxide—400 grams per liter
Potassium nitrate—10 grams per liter
Sodium nitrate—10 grams per liter
Temperature—250 degrees Fahr.

Black on Steel—II

Copper sulfate—150 grams per liter
Nitric acid, gravity 1.35—300 cubic centimeters per liter
Ethyl alcohol—600 cubic centimeters per liter

Parts to be colored are cleaned, immersed, allowed to dry in air and then rubbed with cloths containing oil to darken the color.

During the last few months the author has been conducting some research in the field of steel coloring, namely blacks and browns. An aqueous solution has been developed which will produce dark brown or black on steel provided the object is immersed in it for a few minutes. The coating aids the resistance of steel to corrosion and at the same time is attractive. Further information is available to those interested.

Sodium nitrite, a blackening agent, will produce attractive black finishes on either iron or steel. Iron and steel may be colored red by depositing a coating of copper on the surface, yellow by depositing brass, white by depositing nickel or chromium and black by depositing black nickel. These formulas are readily available. However, it might be pointed out that copper or brass can be deposited on iron and steel and these deposits colored by using methods described for coloring copper and brass.

Table VI

Blue on Steel

Sodium hyposulfite—60 grams per liter
Lead acetate—15 grams per liter
Temperature—212 degrees Fahr.

Blue on Cast Iron

Lead nitrate—7.5 grams per liter
Ferric nitrate—3.0 grams per liter
Sodium hyposulfite—30.0 grams per liter

Coloring lead by forming its own colored salts on the surface is not practical as they all have a tendency to crumble. The best way to color lead or lead alloys is by electrodeposition of other metals and alloys on its surface.

Coloring magnesium ordinarily is of little interest. However, recent research has shown that if magnesium is made the anode in a solution containing various amounts of chromic acid and trisodium phosphate and a current of 15 to 30 amperes is used, a very attractive black coating results. A representative bath contains:

Table VII

Chromic acid—100-200 grams per liter
Trisodium phosphate—100-250 grams per liter
Value of pH—Approximately 3
Temperature—75-200 degrees Fahr.

Coatings produced were gray to jet black in color and rather hard. On analyzing the deposit under a microscope, it was found that certain areas did not take the black coating. A photomicrograph of the black deposit showed that certain areas were uncovered. Analyzing an untreated piece revealed corresponding areas. These parts were undoubtedly segregation areas that do not behave electrochemically as does pure magnesium.

It also was found that this method colors tin but not zinc, brass or iron. Under certain conditions the black coating was obtained by simply immersing the magnesium or tin in the solution. More research is being conducted in this field. The author wishes to acknowledge the work of Mr. Albert Pflomm in this connection.

Other investigators working in

* Head, Institute of Electrochemistry and Metallurgy, 61 East Fourth street, New York; Instructor, Chemical Engineering, Brooklyn Polytehcnic Institute; Contultant.

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this field have found the following solution to give gray to black deposits:

Table VIII

Sodium dichromate—10 per cent
Sodium hydrogen phosphate—2-5 per cent
Anode, magnesium
Cathode, steel

Current density was 5 to 10 amperes per square foot of anode area, with temperature of 50 degrees Cent. with 4 to 4.8 (pH).

Colored nickel and cobalt finishes are not used very often. However, one bath consists of the following solution which gives black or gray tints: Ammonium chloride, 50 grams per liter, and ammonium sulfide, concentrated.

One of the best known methods of coloring nickel black is by electrolysis in a bath containing:

Table IX

Nickel ammonium sulfate—8 ounces per gallon
Zinc sulfate—2 ounces per gallon
Sodium sulfocyanide—2 ounces per gallon
Value of pH—5.3 to 6
Temperature—80 degrees Fahr.

An interesting alloy can be produced by uniting nickel and cobalt. Nickel has a yellow tinge and cobalt a blue. United, the colors cancel each other to give an attractive white, approaching pure silver in appearance. The alloy thus obtained does not turn a yellow color as does pure nickel on long standing and is more corrosive resistant than either cobalt or nickel.

This alloy can be produced electrochemically in thin layers by using ten to one ratio of nickel to cobalt salts. These deposits have better appearance than ordinary nickel. This alloy is being deposited inexpensively on small objects by using the barrel plating method.

Electrodeposits containing nickel and sulphur to produce greenish coatings can be made using a solution containing:

Table X

Nickel ammonium sulfate—100 grams per liter
Sodium thiosulfate—10 grams per liter
Sodium citrate—15 grams per liter
Value of pH—6.4
Current density is 2-20 amperes per square foot

Coloring silver is seldom necessary. Silver is one of the whitest metals known, being the standard for measuring reflectivity. It does not unite with oxygen readily but reacts with sulfides to form brown or black deposits.

A solution of ammonium sulfide, 10 grams per liter, may be used. Varying the concentration and time of immersion produces various shades of brown.

Coloring tin is of interest due to its wide use as a protective coating for steel. A chromic acid solution produces a deep black on tin under certain conditions. This coating is adherent and withstands severe binding and scratching. More research is being conducted on this.

Black coatings on tin have been produced by anodizing the material in a solution containing sodium phosphate, 200 grams per liter, and phosphoric acid, 20 steel centimeters per liter. A 6-minute treatment produced a blue black coating 0.0001-inch thick using a current density of 12 to 48 amperes per square foot at a temperature of 60 to 90 degrees Cent.

Zinc and zinc base die castings have been given an ebony black deposit by immersing in the following:

Table XI

Copper nitrate—7.5 grams per liter
Ammonium chloride—10 grams per liter
Cupric chloride—7.5 grams per liter
Hydrochloric acid, gravity 1.3—300 cubic centimeters per gallon
Temperature—100 degrees Fahr.
Dry and heat to—160 degrees Fahr.

The following solution also has been used to produce black on zinc: Copper sulfate, 150 grams per liter, and potassium chlorate, 80 grams per liter.

An adherent dark brown can be developed by permitting the alloy parts to serve as electrodes in a solution containing 250 grams per liter of chromic acid. A low voltage alternating current is passed through the solution and the color develops in two to three minutes.

A rich brown can be obtained by immersing the material in a solution of sodium thiosulfate, 124 grams per liter, and lead acetate, 38 grams per liter.

A steel blue may be obtained by immersing the metal in a solution containing cobalt chloride, 60 grams per liter, and ammonium chloride, 60 grams per liter.

If nickel ammonium sulfate is substituted for the cobalt salt, a bright purple coating is obtained. The latter solution should be used at 140 degrees Fahr.

Yellow, brown, crimson, blue, purple, and light green may be produced in succession by using the following solution:

Table XII

Copper tartrate—150 grams per liter
Sodium hydroxide—175 grams per liter
Temperature—90-100 degrees Fahr.

A similar solution which produces irridescent sequences of colors contains the following:

Table XIII

Copper sulfate—50 grams per liter
Potassium acid tartrate—50 grams per liter
Sodium carbonate—125 grams per liter

When the above two solutions are used with current, some beautiful results can be obtained using the object to be colored as the cathode with 1 to 10 amperes per square foot. Considerable work is being done in this field and results will be announced later.

A method recently introduced commercially by United Chromium is called Electro-color. Here the object to be plated is the cathode in a solution containing organic copper salts such as copper lactate. A cycle of colors is obtained depending upon the time, all other variables being kept constant.

A rather interesting development in connection with colored metals is the introduction of powdered metals. Various metal or alloy powders are molded into desired shapes using a suitable mold and press. By adding different metals or alloys a great variety of color combinations can be obtained. This interesting development is just getting started.

The field of metal coloring is indeed interesting and one in which more research is needed. More and more metallic objects will be colored by chemical reactions similar to those described as more knowledge in the field is obtained.

Produces Enameling Clay By Micronizing Process

■ By a reduction process known as micronizing, Porcelain Enamel & Mfg. Co., Baltimore, is now producing an enameling clay with a grain size ranging from one to ten microns. In this method the material is caused to grind itself rather than being ground through contact with some other surface.

Refining of clay by this process is said to insure a cleaner product; better enameling efficiency through increased fineness; lower clay content; improved workability; better suspension; and smoother set.

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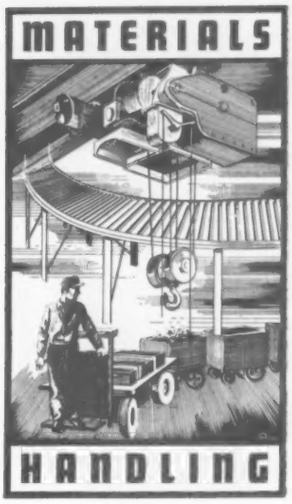

Barge Assembly

Unusual plant includes facilities for constructing welded steel fabrications, weighing up to 750 tons, on an assembly line. Heavy sections are carried on hydraulic transfer cars and moved down the line and to launching ways by winches

By GEO. F. WOLFE
Chairman Welding Committee
Engineering Works Div.
Dravo Corp., Pittsburgh

■ MODERN production line methods are being applied successfully to the manufacture and launching of all-steel barges and other floating equipment. Dravo Corp., Pittsburgh, recently designed and adopted a handling system in which barge sections are fabricated in a structural shop, carried by flat car to a new assembly shop shown in Fig. 1, and then moved progressively to the launching ways. Within the assembly shop specially designed transfer cars move the sections along the production line.

The assembly shop is a 2-bay building of all-welded construction consisting of one main bay, 91½ x 207½ feet, for erection of vessels and a side bay, 63 x 207½ feet, for preliminary assemblies and storage of the fabricated sections. Fig. 1 shows plan view and elevation with respect to launching ways. Letters A, B, C, etc., designate successive positions of a vessel as it progresses to completion. The heavy double lines indicate the system of transfer tracks used to bring the vessel to its final launching position at the point marked E.

Parts for vessels are fabricated in the main structural shop and then are brought to the assembly plant in as large pieces as can be handled conveniently in the 63-foot bay. Designs of all-welded vessels have progressed rapidly and include an improved all-welded steel coal barge, of which more than 100 were built in 1936 and 1937. This barge lends itself particularly well to the assembly line method of production as it was developed to permit large preassemblies.

The barge is of the hopper type, 175 x 26 x 11 feet deep. Sides are box sections, 3 feet wide, 11 feet deep and 30 feet long, weighing 8 tons each. Side frames occur at 2-foot intervals and are preassembled and welded as one operation in jigs. Then they are assembled with plating to form the box section. Overhead welding is eliminated by turning the box section over once during welding. Five such sections form each side of the main body of the barge with similar box sections at corners of rake ends.

Barge bottom is framed transversely with special serrated angle sections, seen in accompanying illustrations, welded to flat bottom plates. A special fitting table automatically spaces and holds the serrated angle sections during assembly and tacking. The flat plate is entered into the jig over a series of roller casters supported on a beam framework which is raised by hydraulic jacks. Serrated angle sections are entered into slots in the cross spacing beams prior to raising the bed by the jacks which clamp the entire assembly into posi-

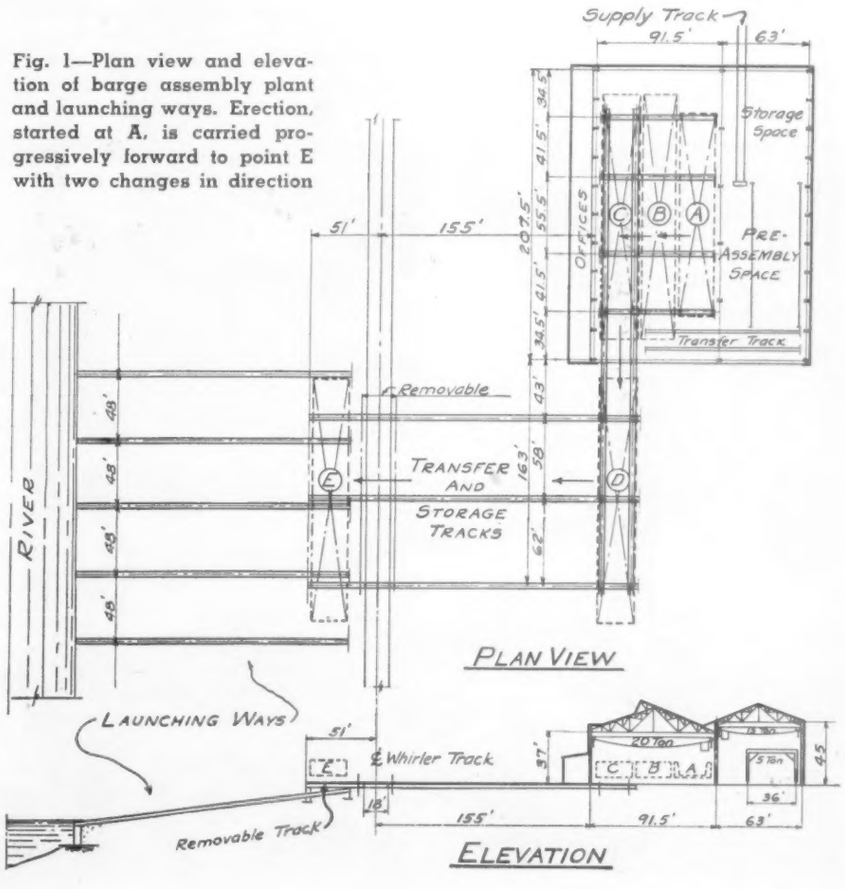

Fig. 1—Plan view and elevation of barge assembly plant and launching ways. Erection, started at A, is carried progressively forward to point E with two changes in direction

tion for tacking. The tacked assembly goes to tilting tables where the section is positioned at about 45 degrees and the serrated angles welded to the plate by a continuous bead. After welding is completed on one side of the connection, table is tilted 90 degrees for welding the opposite bead.

Rake frames are assembled in the structural shop by jigging. Corner section assemblies, similar to side box sections, also are prefabricated in large units before transfer to the assembly plant.

Assembly Begun at Position A

Erection of barge in the assembly plant is started in position A, Fig. 1, by laying down the bottom plates with floor beams assembled and setting thereon the 10 box sections comprising the sides. During assembly in positions A, B, C and D, sections rest on permanent steel supports, shown in Fig. 2, at a level which permits welding beneath the barge. Bottom plate sections come from the structural shop in 8 x 25-foot pieces and are preassembled in the side bay into 25 x 40-foot sections by welding together five of the 8-foot wide assemblies.

With bottom plates and side box sections in position, all sections are aligned and tack welded. Then entire mid body of barge, weighing about 100 tons, is lifted from the blocking by hydraulic jacking carriages on the four transverse tracks and transferred to position B.

Transfer cars, Fig. 2, were studied carefully before the final design was adopted as they are the backbone of the entire handling system. An all-welded steel framework rides on four solid wheels, each 18 inches in diameter and 4½ inches wide. The two lifting beams to which the cushioning timbers are attached are raised by four 15-ton hydraulic jacks actuated by oil under pressure produced by a hand pump. A pressure of 33.6 pounds on the 52½-inch pump handle develops 2390 pounds per square inch pressure on the ram. Working travel of handle is 31½ inches, with 108 strokes being required to raise the jack the full 4 inches of travel under load. This takes about 10 minutes ordinarily.

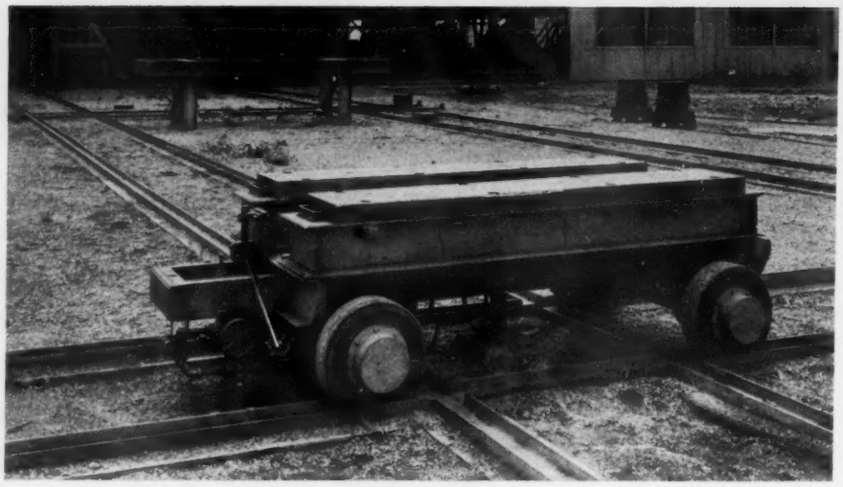

Fig. 2—Transfer car on track outside barge shop showing track crossings and jack used in changing direction of car movement

Fig. 3 (Upper)—Interior of barge assembly plant showing transfer car tracks, 20-ton overhead crane and steel blocking on which barges rest during fabrication. Note hangar type doors. Fig. 4. (Lower)—Showing barges in process of fabrication

Direction of travel is changed at C by lowering the barge a few inches so it is supported on the permanent steel blocking. Lifting frame is lowered until it is about 4 inches below the barge. Then another built-in hydraulic jack at center of carriage lifts the entire carriage on a roller bearing swivel which engages a concrete pier at the track intersection. See Fig. 2. When carriage is lifted so wheels are out of the track groove, carriage is swung by hand in line with the other track. Barge is again raised by main lifting jacks and now travels in a direction at right angles to its former line of motion.

Moved by Electric Winches

Power for moving barges is furnished by two single drum electric winches acting through a wire rope system. Winch motors are 30 horsepower. One winch located at the extreme right side of position A transfers barges to positions B and C. A second winch under position B moves finished vessel out of the building to position D. A similar electric winch at head of launching ways moves barges either into the storage space in the yard or directly to the launching ways.

At position B, the completely assembled rake ends are brought over and attached any any loose plates necessary for complete closure are added. Major portion of final welding is done here after which the barge is moved to position C where any remaining welding is completed. The barge is now tested for

(*Please turn to Page* 75)

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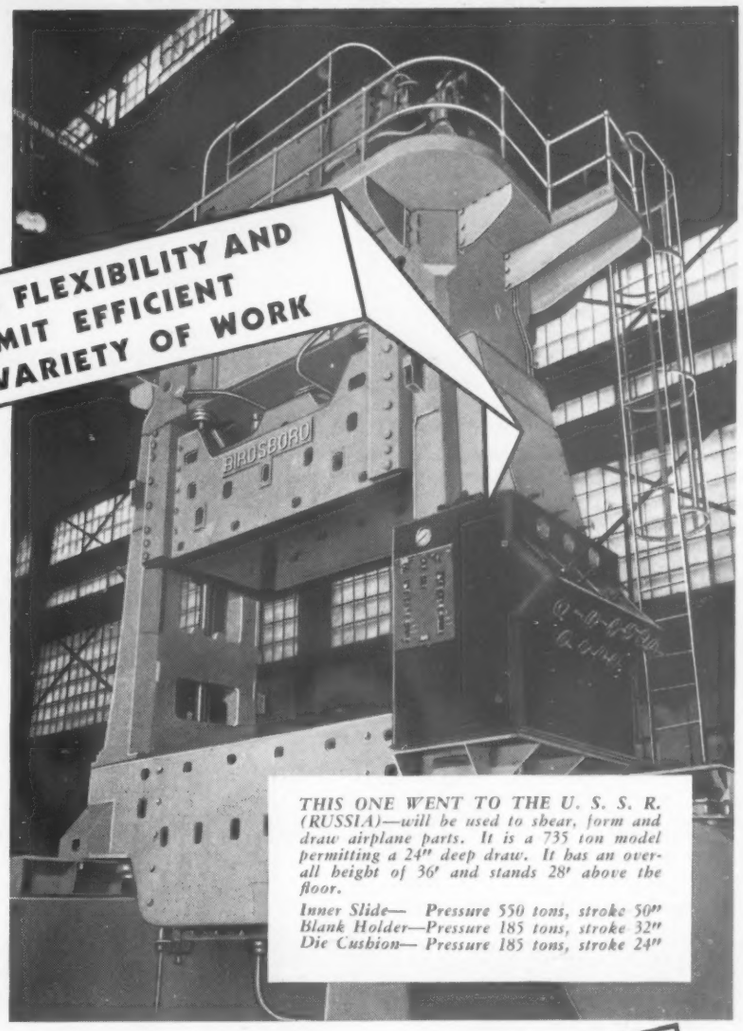

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Hardware Specialties

Many interesting stamping and forming operations are involved in the fabrication of comparatively simple items of hardware. This manufacturer utilizes dies which nest stock and reduce waste material to a minimum

By FRED B. JACOBS

■ IN THE manufacture of shelf brackets, door hinges, screen hangers, cupboard catches and similar items of hardware, Champion Hardware Co., Geneva, O., has found stamping to be the most satisfactory method of fabrication. Automatic and semiautomatic presses with combination dies are used to form these products from 16 to 20-gage steel sheet.

In Fig. 1 is shown a production line devoted to the manufacture of shelf brackets. Presses are arranged so that work progresses from one operation to the next without backtracking or trucking. Material enters line as 16-gage strip steel and emerges as a complete product ready to be finished by plating or japanning, according to specifications.

At the extreme right in Fig. 1 is the press which performs the first operation, which consists of cutting the stock and bending it at right angles. Progressive steps in forming these brackets are shown in Fig. 2. At A is the stock as it comes from the first operation; B shows stock after center rib has been drawn. While this is a fairly deep draw, considering class of work and thickness of the stock, it is performed in one operation. Referring to C, it is shown that one end has been trimmed and the screw holes punched and formed; at D is the bracket after other end has been trimmed and pierced; E shows the finished bracket after center portion has been trimmed. The result of these successive operations is a strong, well-made bracket. Ribbed construction strengthens the piece at the point of greatest strain when the bracket is in use.

In Fig. 3 is shown an interesting forming operation, which consists of curling the end of one side of a steel hinge and broaching the hinge portion where the two members come together. At extreme right is seen a pile of blanks in a chute. From this position blanks are fed automatically under three curling dies and the broach. Traveling on each side of the die bed is a feed bar fitted with automatic fingers. These bars slide back and forth automatically, and at the end of each stroke fingers automatically grip the stock and transfer it from one

Fig. 1—Shelf brackets are fabricated in the series of presses shown below. Work progresses from one machine to another without backtracking

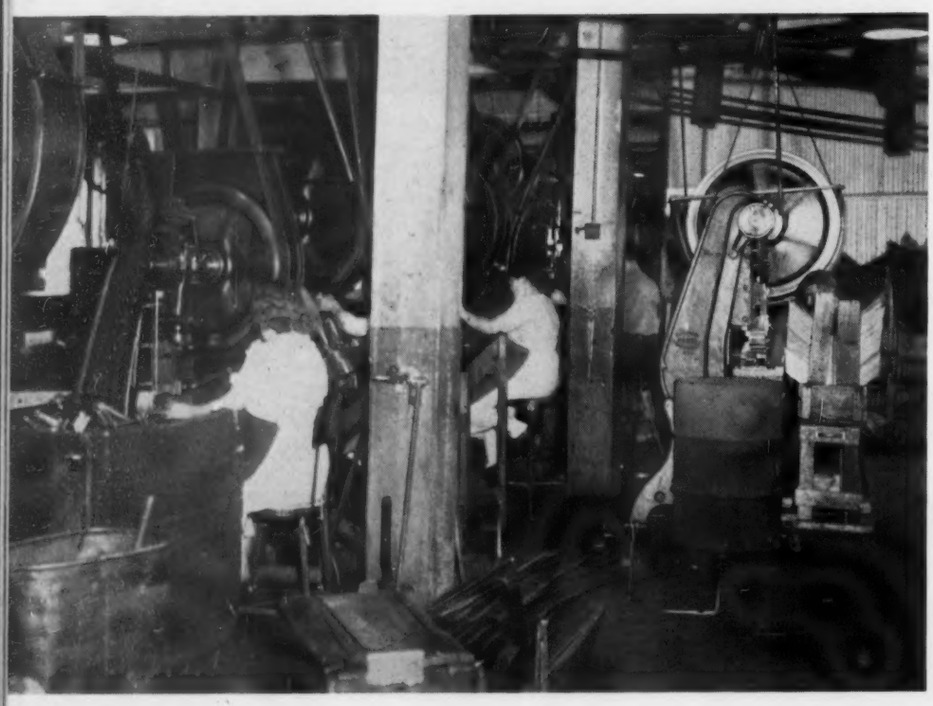
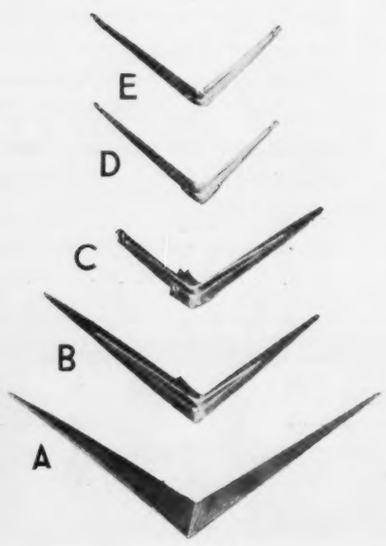


Fig. 2—Progressive steps in the forming of brackets on presses shown in Fig. 1



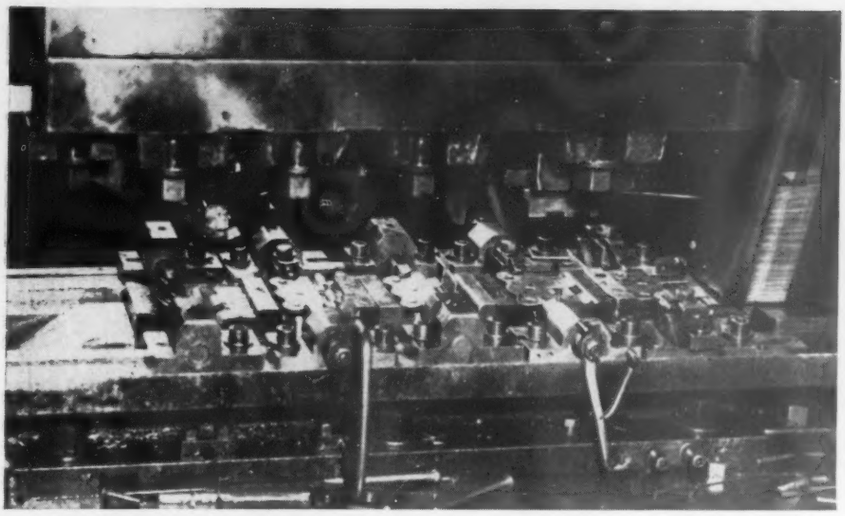


Fig. 3—Multiple dies on this machine automatically form halves for steel hinges. One operator and one machine accomplish work which formerly required four units

die to the next. Thus the entire operation is automatic from the time blanks leave the feed chute until they are discharged from the broaching die. This is an excellent example of the advantages of automatic metal forming, as one machine attended by a single operator takes the place of four presses and four operators which otherwise would be necessary to maintain the same rate of production.

An automatic vertical metal forming press, Fig. 5, blanks and forms screen hangers from 16-gage sheet steel. One of these finished hangers is shown resting against the die at the right. Upper press member slides vertically up and down four pillars. One advantage of this construction is that the strain set up by forming the metal is taken up evenly, which is not the case in an ordinary punch press where all the strain comes at the press throat.

In the machine shown in Fig. 5 stock in the form of 20-gage strip material is fed under the dies automatically by means of the feeding arrangement seen in the foreground. The lever just at the right of center moves the feed bar back and forth; at the left is one of the rachet feed wheels which is mounted on a shaft carrying a feed roller. A similar unit is at the right of the machine but does not show in the illustration. As the scrap stock comes from the press it is cut up under a vertically operated shear. The object of this shear is to cut scrap into convenient pieces which are more easily handled than long sections.

Progressive steps in forming screen hangers are shown in Fig. 4. Stock is pierced and drawn into the desired shape. It should be noted that the punch and die arrangement turns out two finished pieces, which can be seen lying opposite each other, before the final blanking operation. Object of nesting the stock in this manner is to conserve material so that waste is reduced to a minimum.

Operation in Fig. 6 details the steps in forming half of a spring-door hinge from 20-gage sheet steel. First the holes are pierced. Then stock is punched out to form each side of the member. Two subsequent operations consist of raising the ribs, which strengthen the parts, and bending over the ends. Finished part is shown at the top.

Sequence of operations followed in blanking and forming sash pulleys is given in Fig. 7. Here the arrangement of the dies is such that one set of punches and dies makes three pulleys. Die openings are nested to conserve stock, as the illustration shows. The sequence is one piercing operation, two piercing and forming operations, and cutting out. Each pulley is made in two

Fig. 4—Steel sheet showing progressive steps in forming screen hangers. Note how stock is nested to conserve material

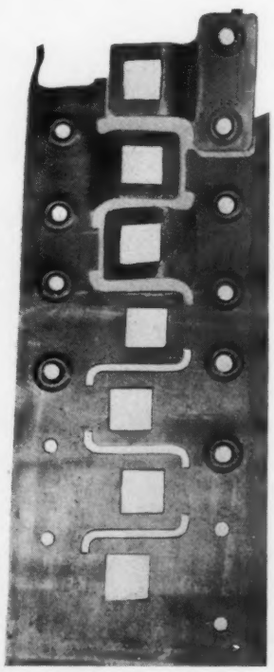
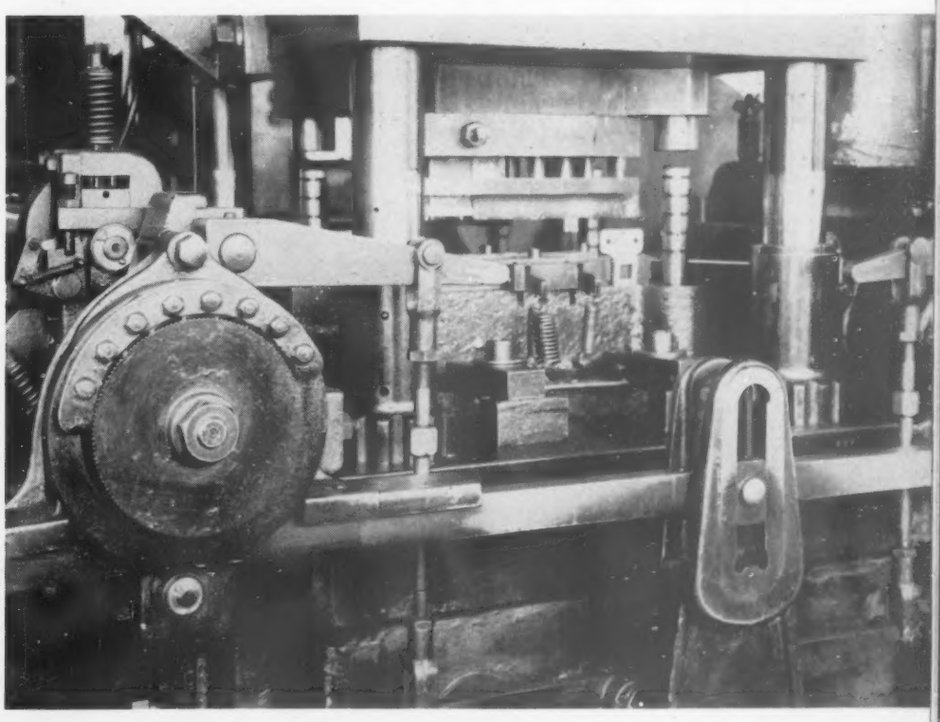


Fig. 5—This machine blanks and forms 16-gage sheet steel into screen hangers. Its feed is entirely automatic



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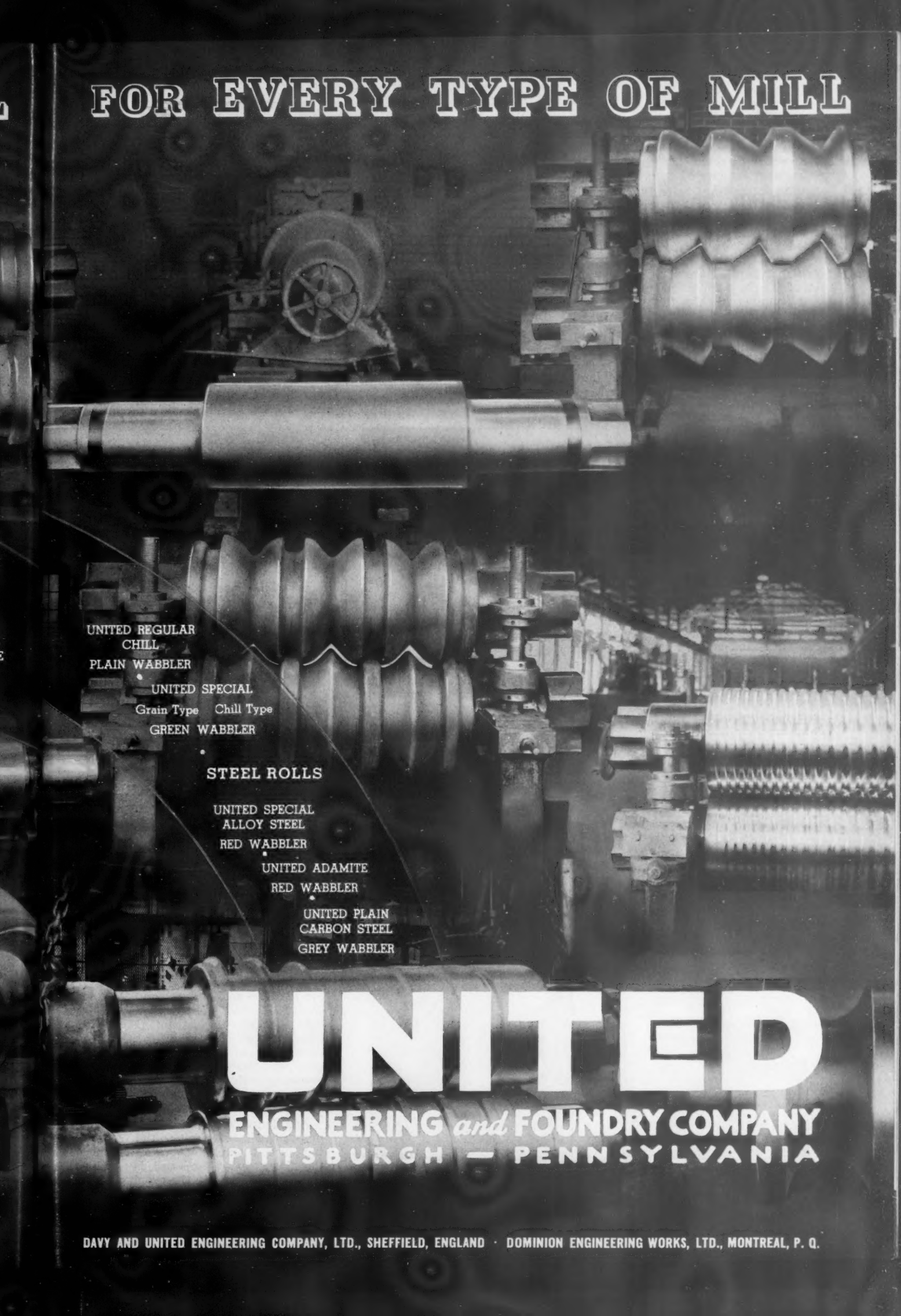
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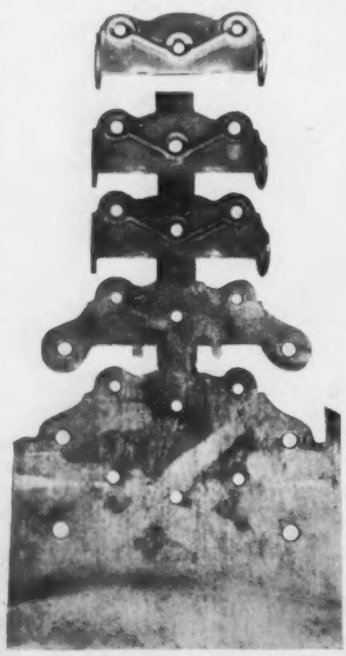
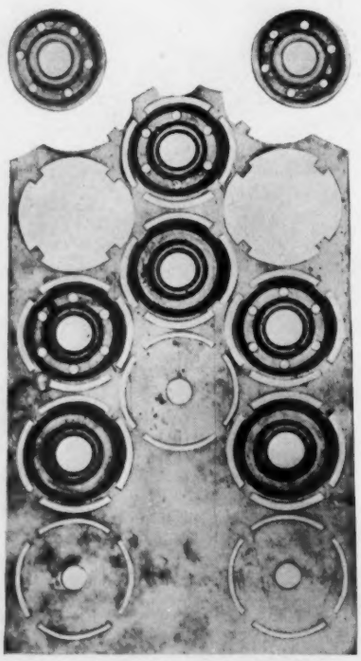
halves. Six little holes in each pulley are pierced to throw up a shoulder on each alternate hole. When the halves are assembled, the thrown-up shoulders are riveted over.

Many interesting wire-forming operations are carried out at Champion Hardware Co.'s plant. For example, coat-and-hat hooks formed from ⅛-inch copper plated wire with a threaded shank for screwing into place are made at the rate of 50 per minute. The stock is fed from a reel through a set of whirling rollers which straighten it, and then it is fed into a wire forming machine. First stock is pointed by a revolving cutter at the thread end. Then it is cut off to the required length and fed forward to bending dies and rolls which form the six necessary bends. Stock is discharged onto a conveyor belt which takes the hooks to a thread rolling machine. In forming the threads, hook is simply placed in position; the moving die completes the operation, discharging the finished hook into a chute or barrel. These hooks are japanned or plated and in some cases are sold just as they come from the forming machine.

Springs for spring butts also are formed automatically. Vertical type spring winding machines are used at the Champion factory. The stock is ⅛-inch, high-grade spring steel. It is fed automatically past a dog on the arbor which gives a grip to coil the stock. Enough stock is fed in place so that an inch of straight material is left at one end. This is accomplished by feeding the stock against a stop. Then the arbor starts to revolve, at the same time moving upward to form the necessary lead, and winds a predetermined number of coils. It then stops automatically, the wire is cut off to leave an inch of straight material, spring is cut off automatically and discharged into a receptacle placed to receive it. These springs can be wound at the rate of 60 a minute.

Fig. 6. (Left)—Steps in forming half of a spring-door hinge. Fig. 7. (Right)—Sequence of operations in blanking and forming sash pulleys. One set of punches and dies makes three pulleys





Gas-Filled Cable Is Developed

■ ANNOUNCEMENT is made by General Electric Co., Schenectady, N. Y., of a gas-filled cable for underground transmission of moderate-voltage current. In this new cable less insulation is required for a given conductor size than in the solid type. As a result gas-filled cables of a higher rating can be substituted for solid types without enlargement of manholes. Cost of the two types is comparable. Adjustment of gas pressure can be handled by gas reservoirs when required. An alarm system can be installed to detect gas leakage.

In construction the new type cable is similar to oil-filled cable. The principal difference is that instead of being filled with gas-free oil, channel spaces are drained before cable leaves factory and cable system is filled with nitrogen, under a moderate pressure of 10 to 15 pounds per square inch. Operating voltage

Cross section of a three-conductor, gas-filled cable rated 15 kilovolts, 800,000 circular mils. The three small channels which convey the gas and equalize pressure are designed to "leak," so that nitrogen actually is in direct contact with the impregnated paper insulation

stress of the gas-filled cable, in volts per mil, is not as high as that of the conventional solid type impregnated paper-insulated cable.

Nitrogen has been found to be the most satisfactory gas for use with this cable because it has good dielectric strength, does not affect the solid insulation chemically and its absorption by the impregnating compound is small.

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Arrange Program for Tool Electrification Forum

■ Most of the papers on the program for the 1939 machine tool electrification forum, sponsored by the Westinghouse Electric & Mfg. Co., and to be held at East Pittsburgh, April 18-20, will be presented by visiting representatives of the machine tool industry.

W. F. Ridgway, Ingersoll Milling Machine Co., Rockford, Ill., will speak on considerations determining sizes and characteristics of motors for machine tool service; and R. S. Elberty, Landis Tool Co., Waynesboro, Pa., on cost advantages and limitations of electric drives. Other discussions by visiting representatives will include: Applications of reversing motors, control devices, instruments, and electric handling of auxiliary machine functions.

Additional features of the forum program will be a visit to the Westinghouse research laboratories on the afternoon of the third day and the annual dinner in the evening.

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U·S·S COR-TEN, the *pioneer* low-alloy, high tensile steel has a yield point of 50,000 lb. per sq. in. Its modulus of elasticity — resistance to bending—is almost three times that of non-ferrous "light" metals. Its resistance to corrosion is 4 to 6 times that of plain steel. Its durability is in equal ratio. That is why stress-carrying members of U·S·S COR-TEN do not have to be thick to be strong, stiff and durable.

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STATES STEEL

Power Supply

Transforming 3-phase power to single-phase with a motor-generator set of proper design appears best method of supplying large resistance welders. Also greatly reduces line voltage fluctuations and improves operation of other equipment

By R. H. WRIGHT
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

■ INCREASING use of resistance welders has emphasized the difficulties due to the heavy single-phase fluctuating loads this type of equipment imposes on power systems. The loads may range from a few kilovolt-amperes for a few cycles up to several thousand kilovolt-amperes for as long as 10 seconds or more as in the case of large butt welders.

Where the welding equipment is supplied from a small private generating station, these heavy loads may not only cause troublesome voltage fluctuations but may damage the damper windings of the generators. If power is purchased from a utility, voltage fluctuations may still be present, not only in the plant but often in the entire adjacent area. To eliminate such disturbances it has been necessary in numerous instances to install motor-generator sets to serve as phase converters, changing conventional 3-phase power over to single phase as required by the resistance welder.

Among the early installations of such generators for welding service were several employing a heavily overexcited field. The main circuit between the generator and the welder was closed and opened for each weld. However, this proved undesirable because, if the main circuit was opened accidentally during a weld, high open-circuit voltages were developed resulting in bus insulator flashovers and damage to the generator windings. All this resulted in excessive maintenance.

These difficulties, however, were materially improved by changing over to generator field control. This type of control appears best adapted for welder service. In present recommended practice, the generator is connected continuously to the primary of the welding transformer, circuit-breakers in the main leads being used only for short-circuit protection. Complete control of the welding cycle is obtained by a field contactor and a field rheostat.

No automatic voltage regulating equipment is required for butt welder service as the load is quite stable during the weld for this class of welding. The type of weld performed with this equipment consists in making butt welds such as in fabricating automobile rear axle housings as in Fig. 2. As seen in Fig. 3, the load on this type of weld is quite stable. Thus, only infrequent adjustments are required to compensate for changes in welding conditions.

Synchronous Motor Used

Generators for this service can be driven satisfactorily by synchronous motors. Where it is desired to reduce the line peaks or reduce the rate of change of input, wound rotor induction motors with flywheels are used. A fixed slip resistance provides a satisfactory means of equalizing the peaks.

Flash welders, however, have a different type of load. Here sheets or plates are welded together at the edges, being first clamped in the welding machine with the edges parallel. The edges then are brought together lightly and power is applied. Arcing and burning of the metal occurs uniformly throughout the length of the joint, and the two pieces are heated rapidly for a short distance back of the line of contact. During this period which may take 10 or 15 seconds, any irregularities in the edges of the stock are burned off and the load is relatively light. As the heating extends over the en-

Abstracted from a paper presented at the winter convention of the American Institute of Electrical Engineers, January, 1939.

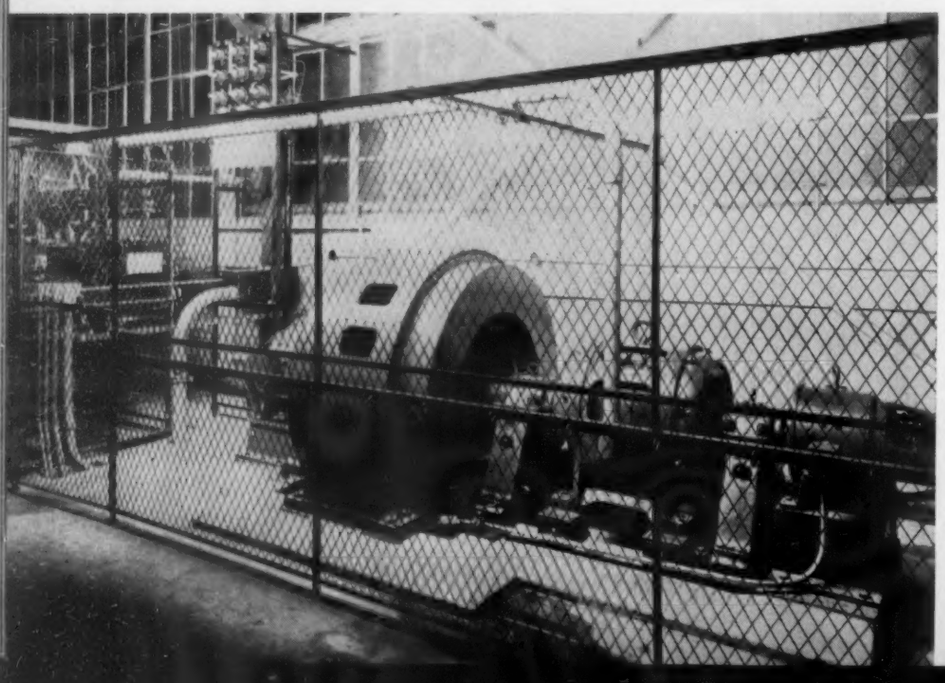
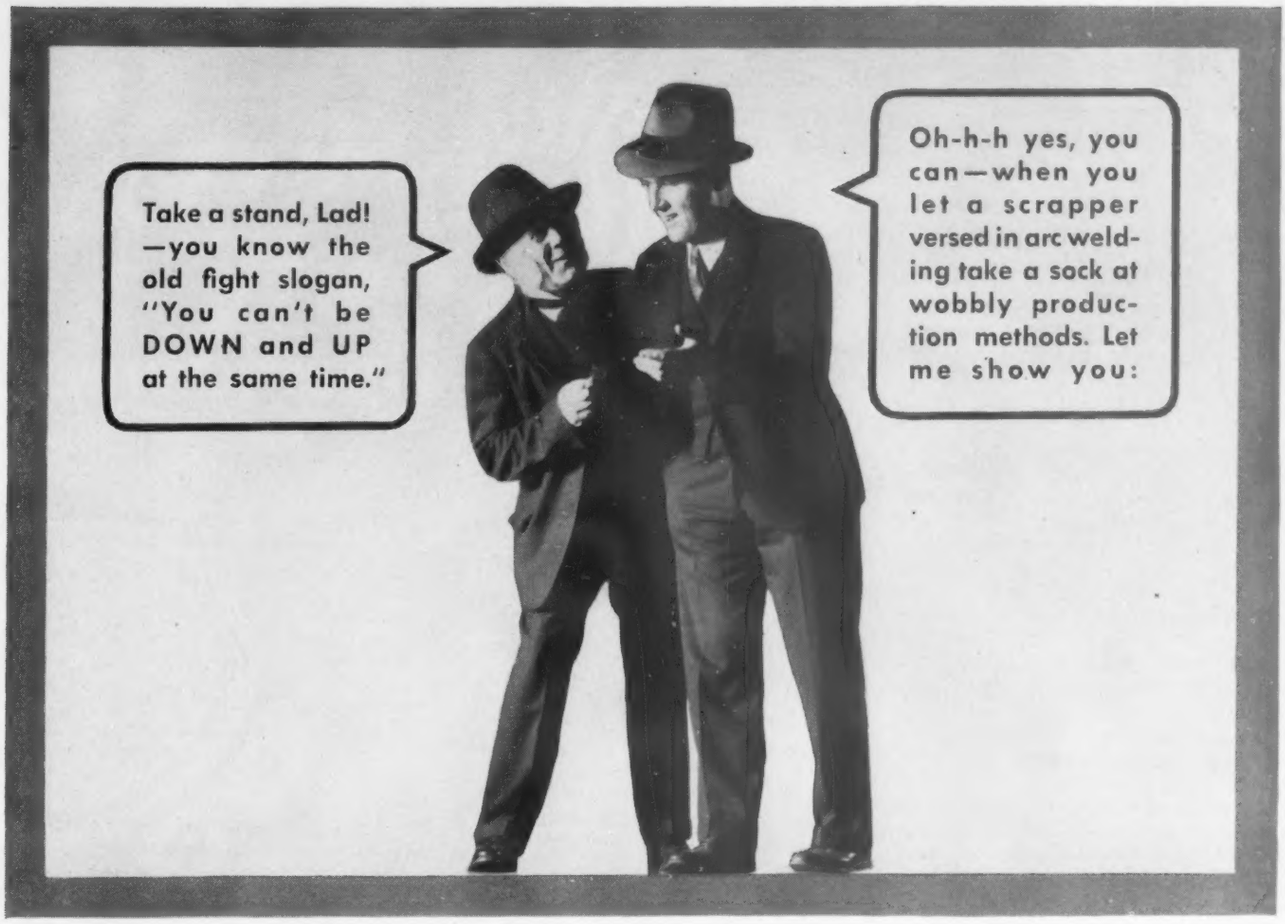


Fig. 1—This single-phase generator supplies a spot welder. Generator is rated 700 kilovolt amperes, 30 per cent power factor and is driven by a 150-horsepower squirrel cage induction motor

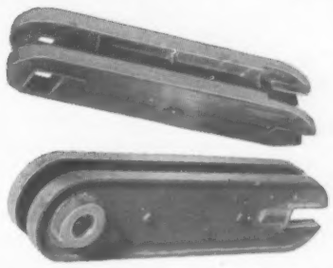

Take a stand, Lad! —you know the old fight slogan, "You can't be DOWN and UP at the same time."
Oh-h-h yes, you can—when you let a scrapper versed in arc welding take a sock at wobbly production methods. Let me show you:

HOW TO DRIVE COSTS DOWN AND QUALITY UP

● "Take the case of a manufacturer of textile machinery in Patterson, N. J. Over a 1-year period they reduced the cost of a scouring machine 47% and doubled its production, largely because they had in their organization *a man of authority with a Zest for welding.* His function is Profit Crusader because he drives costs DOWN and quality UP through his crusade for welding. By putting such a leader in charge of welding development and production, hundreds of companies have benefited in this way:

"Manufacturing operations are centralized and simplified. Products are made stronger, stiffer, lighter and of more pleasing appearance. Delivery time is shortened. Service economy is increased. *Everybody profits.*

"In most plants, the Profit Crusader works on a part-at-a-time basis. It's simple. For example, take this sprocket housing for a weaving machine. The former construction, shown at the top, occasionally broke in service. The P. C. took steel plate, flat bar, pipe spacers and a machined hub and built the part shown at



the bottom. It costs $8.70 less, weighs 20% less and is unbreakable. Costs are DOWN—quality UP.

"As I said before, all that's needed to get this economy rolling is to appoint a man with a welding Zest . . . and by Zest I don't mean a vest with a zipper. Consult Lincoln."

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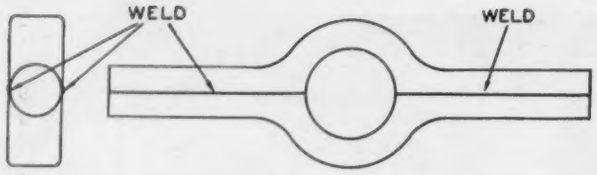

Fig. 2—Type of butt welds made on automobile rear axle housings with a butt welder

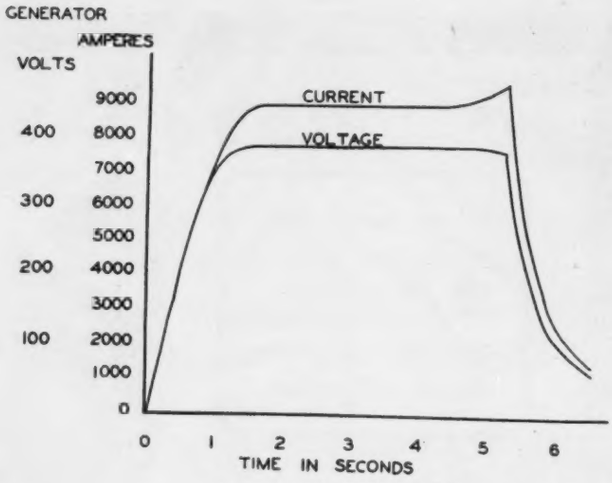

Fig. 3—Typical single-phase load on a butt welder making welds such as shown in Fig. 2

tire length of the joint, the load rapidly rises to a maximum and fluctuates violently.

Power in these applications is usually controlled by a contactor in the primary circuit of the welding transformer. For many applications it is not necessary to use a voltage regulator to maintain satisfactory generator voltage. In such cases, generator field forcing is used. Between welds the generator excitation is only sufficient to give approximately full voltage at no load. A field-forcing contactor is interlocked with the main welder contactor so it shunts a portion of the generator field resistance at the start of the heating period. Voltage variation during the heating period thus is limited to less than 5 per cent. At the end of the heating period the field-forcing contactor opens, and normal no-load excitation is restored. Where it is felt that closer regulation of voltage is required to give the desired uniformity of weld, a voltage regulator and quick response excitation system can be used.

Typical Application

In a typical application of such equipment, a 500-kilovolt-ampere, 400-kilovolt, single phase generator supplies a flash welder welding two plates 0.107-inch thick and 80 inches long at the weld. Starting with 485 volts, the generator voltage at no load, there is first a slight dip in voltage when the main contact closes. This is followed by gradual rise to 509 volts when the full effect of field forcing is obtained. From this point to the end of the weld, the maximum voltage variation is 3 per cent with load variatons from approximately 35 per cent of generator capacity to nearly 80 per cent of capacity.

In this application, the generator is driven by a synchronous motor so the load fluctuations are reflected directly to the power line. While load peaks are quite evident on the station chart, no difficulty is experienced in maintaining a steady voltage on the system. In other cases, however, where the welder may impose peaks of several thousand kilovolt-amperes, it might be advantageous to use an induction motor and flywheel to level out the violent fluctuations and to limit the input to an average value. In the majority of applications, however, a synchronous driving motor will be quite satisfactory on such equipment.

Spot and seam welders usually operate in conjunction with timers which definitely fix the duration and energy input for each weld. Usually the time per weld varies from 1 to 12 or 15 cycles. With spot welder, welds are made at random as desired by the operator, so power impulses follow no denfiite pattern. The load on a circuit supplying a seam welder, however, consists of a succession of short impulses repeated at regular intervals. Electronic timers are in quite general use for both spot and seam welders.

Because of the peculiar nature of the load, the generators supplying spot and seam welders experience very short duration of the welding peaks, so it is impractical to use generator field-forcing contactors. Also for the same reason it is of little value to use generator voltage regulators. Single-phase generators for such service are usually designed so the normal capacity is approximately equal to the peak welding load. The transient voltage drop and the inherent voltage drop at full load are made approximately equal. Excitation is kept constant at a value giving the desired voltage during the weld.

In spot welding service, the welding time is only a small percentage of the total time, so the root-mean-square loads on the generator and its driving motor are moderate. If a synchronous motor is used, the capacity is determined largely by the magnitude of the peaks received from the generator. Also, it may be possible for the frequency of the load pulsations to approach the natural period of oscillation of the set. Under such conditions, the synchronous driving motor may pull out of step unless special precautions are taken. For these reasons, it is more satisfactory to use an induction motor to drive a generator used in spot welding service. A squirrel-cage motor with a small amount of slip will utilize the flywheel effect of the set to equalize the peaks and insure stable operation. Fig. 1 shows a typical 700 kilovolt-ampere, 0.30 power factor, single phase, spot welding generator with a 150-horsepower, squirrel-cage driving motor.

A seam welder will operate under steadier load conditions and so requires a larger driving motor to carry the higher average loads. Either a squirrel-cage motor or a synchronous motor will be satisfactory. In many cases it will be advantageous to use a voltage regulator with the generator to insure uniform welds.

Tube Welding

Certain kinds of thin walled tubing are made by passing long coils of steel strip at constant speed through a forming and welding machine. Where alternating current is used in the welding, it may be desirable to use a frequency higher than that of the regular supply circuit. Then a generator with a single-phase output of the desired frequency is employed. Since close voltage regulation is essential, a voltage regulator is usually included. As the load is steady and practically continuous and since speed variations should be minimized, a synchronous motor gives the most satisfactory drive here.

Regardless of the type of welding service encountered, it is desirable to make each installation as simple as possible. It is preferable in all cases to use generators with specially designed single-phase windings rather than to use one phase of a 3-phase machine. Because of the vibration inherent in a single-phase machine, it is highly desirable to avoid working welding generators at high overloads. Also, the volt-

(*Please turn to Page* 75)

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Choice of Cutting Tools Rests in Maintenance vs. Production Costs

■ TWO basic factors to be considered in the design of any type of cutting edge are chip formation and chip removal; with an understanding of these it is possible to prepare the proper tool for any machining operation. L. C. Gorham, president, Gorham Tool Co., Detroit, presented data bearing on these factors in his address at the concluding technical session of the American Society of Tool Engineers in Detroit, March 17, before an evening audience of 400.

Dividing cutting tool materials into three classes—high speed steels, the Stellite-type materials, and the cemented carbides, Mr. Gorham summarized the various types of tools in each class. In the first classification are two types—the tungsten-base steels and the molybdenum-base steels. Eight types of tungsten steels are used, the most common of which is the 18-4-1 tungsten-chrome vanadium analysis. On more difficult operations, the vanadium percentage is increased to produce two other analyses, the 18-4-2 and 18-4-3 ½ steels. To improve red hardness, cobalt is added, and three analyses have withstood the test of time, 18-4-1 plus 4 per cent cobalt, 18-4-2 plus 8 per cent cobalt and 22-5-1 ½ plus 12 per cent cobalt. For extremely heavy turning operations such as on munitions work, the 14-1-4-2 with no cobalt and 14-4-2 with 5 per cent cobalt high speed steels are used.

Molybdenum Replaces Tungsten

The molybdenum-base high speed steels have been developed out of economic necessity, because of lack of tungsten ores in this country. Molybdenum has been found to have about twice the alloying effect of tungsten, and it is used in tool steels both with and without tungsten. Decarburization at high temperatures has been overcome by use of the controlled atmosphere furnace or salt bath. Still to be overcome in some sections is the objection encountered from operators who imagine the tool material is not suitable because its grinding spark is not the same as that of the tungsten-base material.

Most common of the molybdenum steels is the Mo-Max type, containing 8 per cent molybdenum, 2 per cent tungsten, 4 per cent chromium and 1 ½ per cent vanadium. Six other analyses also are available in this category.

Mr. Gorham pointed out that the matters of design and metallurgy have been amply covered in the molybdenum tool field, but there is a definite need for more information on performance and production records with this type of steel.

The Stellite materials, having no annealing state, are not forgeable and must be centrifugally or gravity cast. They have superior hardness but lack strength. They are most applicable on roughing cuts on cast iron. Advantage also derives from the fact they can be welded without injury, making possible the brazing of Stellite to a steel back as in the inserted-tooth serrated cutters.

Discusses Cemented Carbides

In the field of cemented carbides, Mr. Gorham stated that producers have done a commendable job of informing prospective users about these materials and what performance can be expected, although in some quarters the impression has been received that the carbides are cure-alls in machining work, which they of course are not. Careful control in the application of carbide tools is essential. They are excellent materials on light roughing cuts as well as finishing cuts, and become more so as modern machine tools replace old units.

Mr. Gorham observed that the most difficult aspect of determining which type of tool to specify for a given job was in the matter of maintenance cost versus production cost. He suggested the use of the least expensive tooling on long production runs, with the higher cost materials held in reserve.

In the selection and use of gages, there are a number of points to be taken into consideration, including cost of using them, gage maintenance, degree of quality obtained, space available, type of machines in use, accuracy, and the like. These were considered in a discussion by C. Johnson, Pratt & Whitney division, Niles-Bement-Pond Co., Hartford, Conn., who commented briefly on the tremendous advancements which have been made in gaging in recent years. Gages appear to have three signal advantages: They lower costs, prevent spoilage and overcome the human error. They can be stepping stones or stumbling blocks, depending upon how intelligently they are used.

Complete processing of gears before heat treating, leaving only a cleaning operation after hardening, is now being practiced in some shops, and more general use of this procedure was predicted by R. Drummond, National Broach & Machine Co., Detroit. Chief reason why this is possible has been the development of distortionless steels, or rather steels with uniform and calculable distortion. Accompanying better steels has been an improvement in forging practice, resulting in fewer defects in forged tools.

Mr. Drummond reviewed the trend toward increased use of gear shaving equipment for the production of light gears, many producers now forming gears by one roughing cut and finishing on a shaver. Shaving tends to relieve strains set up by the roughing operation and also to remove slight inaccuracies. New ideas in tooth profile and pitch fineness of gears also came up for comment at the session.

Speaking at the Tool Engineers' annual banquet, attended by over 500, William B. Stout, president, Stout Engineering Laboratories, Detroit, emphasized importance of tooling and machine operations in industry, suggesting that many of the important advances in engineering and science be credited directly to the artisans in tools and machines which have made these achievements possible.

Citing how many new ideas are conceived by those who are not hidebound by tradition, Mr. Stout mentioned a new type of electric switch comprising two copper contacts joined by a length of rubber hose, with the space between the ends of the contacts filled partially with mercury. The switch is opened by pinching the hose, thus breaking the mercury contact.

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Frames for Dormitory Are Arc-Welded Steel

■ Light welded steel frames, used in erection of a multiple-unit dormitory at Stanford university, provide a satisfactory type of steel construction for intermediate buildings of one or two stories, according to a report to the welding research committee of the Engineering Foundation.

Building elements of the dormitory are studs and joists spaced as they usually are in wood construction. Steel used in the members is only 1/16 or ⅛-inch thick, and all joints were made by arc welding. This type of framing produced a rigid structure, highly resistant to earthquake shocks and other unusual stresses. Frame cannot be attacked by termites and is fire-resistant. The problem of shrinkage is eliminated. Because of the open-web construction of the joists, a convenient space is provided for conduits and pipes. One of the greatest advantages of this construction is its speed; frames of all four buildings were completed in only 30 days.

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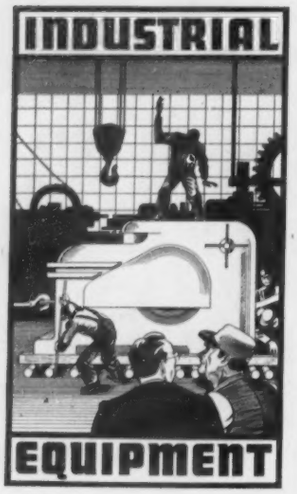


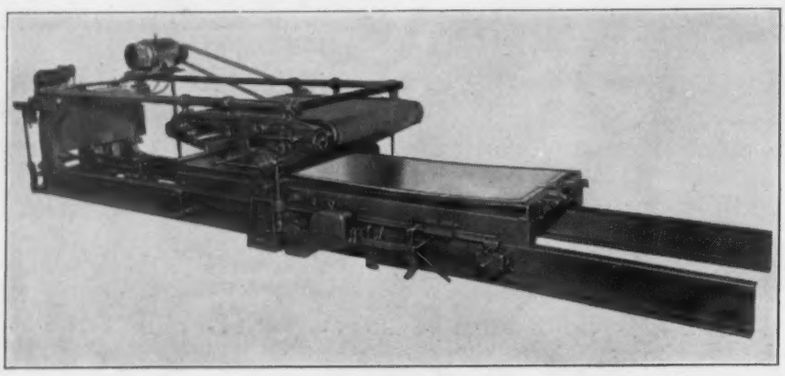
Introduces Polishing Machine for Stainless

■ Excelsior Tool & Machine Co., East St. Louis, Ill., has developed an improved machine for polishing stainless steel sheets.

There are no complicated attachments that require compressed air, oil or electrical control adjustments. All operations are mechanically controlled and are adjusted from one location by the operator. It is said this unit can be operated satisfactorily by inexperienced labor. Pressure applied to the rubber-covered contact drum for the abrasive belt is controlled by gravity. Any required pressure from 300 to 500 pounds is obtainable by removable handweights.

Grinding belt is operated by a 30-horsepower motor, and traveling carriage is driven by a 2-horsepower motor. A clamping device prevents sheets from slipping while machine is running. Carriage cannot overtravel. Endless paper grinding belts, 16 feet long and up to 50 inches wide, are used on the standard machine, and for No. 4 finish 100, 120 and 150 grit are employed. Approximately 4 to 6 sheets can be polished per hour with 4 to 10 complete passes over each sheet. Machine will polish sheets of any thickness up to 48 inches wide and 12 feet long. Belt speed is 3500 lineal feet per minute, and table travel is 58 feet per minute.

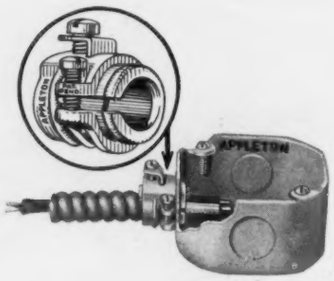
Grinding belts for this stainless steel polishing machine can be removed and replaced in about 5 minutes and require no further adjustment after being located centrally on the drums



Devises Connector Which Requires No Locknut

■ Appleton Electric Co., 1701 Wellington avenue, Chicago, has introduced a Loxbox connector which requires no locknut. By turning a screw located directly adjacent to screw which tightens clamp, jaws of this connector expand and bite into box, assuring a perfect ground.

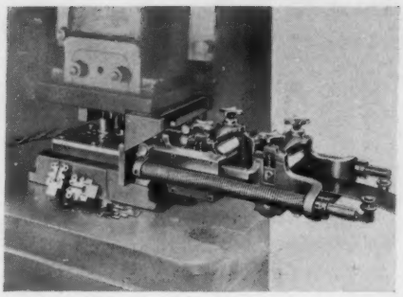
Connector is easy to install. No. 7215-V connector is adapted for ABC armored cable, and No. 7216,



which is similar in construction and equipped with an adjustable clamp, accommodates nonmetallic sheathed cable, Romex, etc.

Die Feed Adjustable in Thousandths of an Inch

■ H. E. Dickerman Mfg. Co., Springfield, Mass., has introduced a new die feed for the handling of heavier and wider material to presses. Feed can be installed on almost any type of punch press and can be placed on the die-set in any position for any style die. Only three screws are required in mounting. Because it requires no connection to the power shaft of the press, this feed

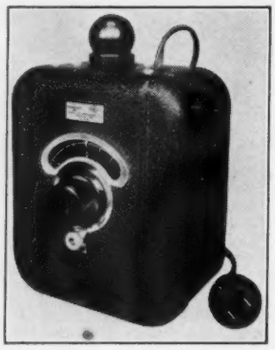


and the required die-set may be set up at will on any idle press.

Feed is designed to handle coiled stock of any practical thickness in widths up to 4 inches. Its main springs are made of oval wire for compactness and low fiber stress. Frame is solidly built of semisteel castings, finished in heavy enamel. Maximum feed is 3 inches for a 3-inch press stroke; 2¾ inches for a 2½-inch stroke; and 2¼ inches for a 2-inch stroke. Feed can be adjusted in increments of 0.001-inch from 0 to maximum feed.

Process Timer Controls Industrial Cycles

■ Potter & Brumfield Mfg. Co., Princeton, Ind., has developed the type MS process timer, a commercial unit which may be used as a signal to attract operator's attention at end of a definite period, or



to operate small motors, lights or other electrical devices requiring not more than 660 watts at 110 volts.

Timer is set by rotating the knob in a counter-clockwise direction until pointer indicates desired time interval. This turns on the pilot light, located on top of the timer, and it will remain on until cycle has been completed. Unit can be furnished in a model which turns off the light while timer is running and then turns it on at end of the cycle. Timer also may be provided with a buzzer inside the case to operate at end of the cycle.

An easily adjustable stop permits

Where rust may mean disaster HOT-DIP GALVANIZING is needed

Rust is no sentimentalist. It has already caused too many accidents. In bleachers, playground equipment and structural steel athletic fixtures, there is no substitute for perfect protection . . . Only Hot Dip Galvanizing guarantees an adequately thick coating of zinc and a union between zinc coating and base metal which makes each an inseparable part of the other . . . Metallurgists will tell you that nothing serves so long for so little as Hot Dip Galvanizing. Patronize members of this association and *know* that you are getting a perfect job every time . . . Write us for literature and learn the truth about galvanizing. American Hot Dip Galvanizers Association Incorporated, American Bank Building, Pittsburgh, Pa.

Acme Galvanizing, Inc., Milwaukee, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Tinning & Galvanizing Co., Erie, Pa.
Atlantic Stamping Co., Rochester, N. Y.
Buffalo Galvanizing & Tinning Wks.,Inc.,Buffalo, N.Y.
Columbian Steel Tank Company, Kansas City, Mo.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
The Fanner Mfg. Company, Cleveland, Ohio
John Finn Metal Works, San Francisco, Cal.
Thomas Gregory Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa.
The Hodell Chain Company, Cleveland, Ohio
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co., Columbus, Ohio
Joslyn Co. of California, Los Angeles, Cal.
Joslyn Mfg. & Supply Co., Chicago, Ill.
L. O. Koven & Brother, Inc., Jersey City, N. J.
Lehigh Structural Steel Co., Allentown, Pa.
Missouri Rolling Mill Corp., St. Louis, Mo.
The National Telephone Supply Co., Cleveland, Ohio
Penn Galvanizing Co., Philadelphia, Pa.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
San Francisco Galvanizing Works, San Francisco, Cal.
The Sanitary Tinning Co., Cleveland, Ohio
Standard Galvanizing Co., Chicago, Ill.
Wilcox, Crittenden & Co., Inc., Middletown, Conn.
The Witt Cornice Co., Cincinnati, Ohio

IF IT CARRIES THIS SEAL
IT'S A JOB WELL DONE

operator to set timer for processes which require repeated cycles of equal duration. Unit is capable of timing very short periods, since switching mechanism functions instantly when knob is turned. Timing train is driven by a self-starting synchronous motor.

Pressure Fan Moves Air Against Resistance

■ M. B. Sturtevant Co., Hyde Park, Mass., has placed on the market the Axiflo pressure fan, said to be well adapted for such industrial applications as heating, ventilating, cooling, mechanical draft, drying, humidifying and fume, vapor or dust removal. Blades are so pitched that wind resistance has little effect on air delivery.

Fan has a mechanical efficiency of 79 per cent, and is said to possess economical operating advantages of

the axial flow type fan combined with the performance of the centrifugal fan. Casing is heavily built and is fitted with a streamlined inlet. Wheel is integrally cast, heat-treated aluminum alloy, which is noncorrosive under the action of most acid content chemical fumes. Fan is available either for direct connected motor drive, as illustrated, or belt drive, and can be arranged for wall, floor, platform or ceiling installation. There are 11 sizes ranging from 18-inch to 60-inch diameter in capacities up to 75,000 cubic feet per minute.

Guard Protects Hands Against Metal Edges

■ Industrial Gloves Co., Danville, Ill., has placed on the market a reversible chrome leather handguard which fits either hand. Designated as No. 12237, this guard provides efficient protection for workers' hands where metal sheets, shapes, stampings, bars, angle irons, etc., are handled.

Steel ribbons are placed diagonally on wearing surfaces to give

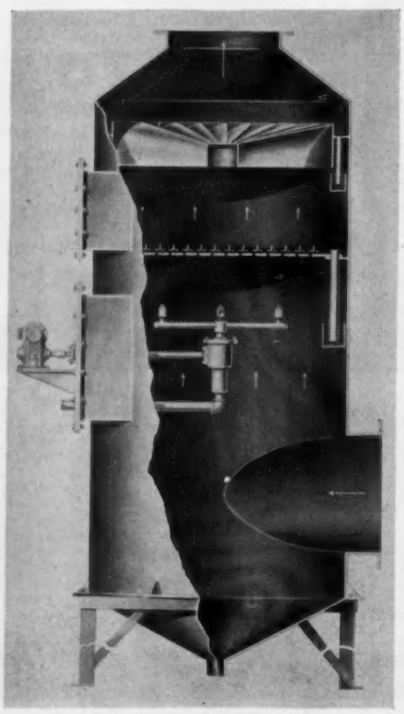
greatest protective service against sharp, cutting edges. Guard is 7 inches long and may be worn with cotton gloves or over the bare hand. It may be had in 6 and 7½-inch lengths in plain leather without the steel ribbons.

Scrubber Removes Fog And Dust from Gas, Air

■ Peabody Engineering Corp., 580 Fifth avenue, New York, has developed a scrubber for the removal of fog, dust and other particles from gas and air.

Separation of impurities is a three-step process. Gas enters tangentially near the base and is there relieved of coarse particles by cyclonic action. Then it passes upward through a zone of water or scrubbing liquid, supplied by slowly rotating sprays which operate at 10 to 15 pounds pressure. Dust particles mingle with water droplets at this stage. Continuing its travel, gas encounters a plate with coarse perforations. On passing through these, velocity of gas is greatly increased. Mixture of gas, dust and droplets is shot through the plate perforations directly at square baffles and on impact merges with water surrounding the baffle. At this point final cleaning takes place.

A liquid overflow pipe, located slightly above the baffles, carries off dust-laden water. Purified gas or air is deflected around the baffles and continues upward toward outlet of the shell. Eliminator vanes entrap any droplets and only dry gas is delivered.



Abrasive Machine Cuts Both Tubing and Rods

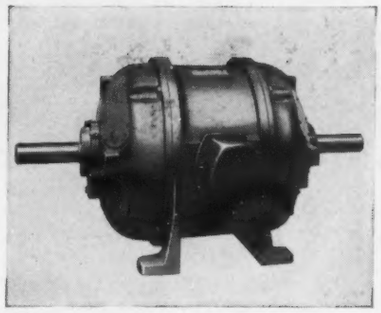
■ Andrew C. Campbell division, American Chain & Cable Co., Bridgeport, Conn., has announced

an abrasive cutting machine, designated as Campbell No. 213, for cutting tubing up to and including 3½-inch, or solid rods up to and including 2-inch.

Coolant system distributes coolant equally to both sides of the abrasive wheel, insuring more accurate cuts. There is a micrometer stop bar, which can be set to any length, without use of measuring tools, within plus or minus 0.020-inch. Other improvements featured are holding pressure clamps, convenient coolant shutoff, reversible work holder liners and safer wheel guards.

Motors Designed for Frequent Starts, Stops

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has brought out a line of type CS squirrel-cage hoist motors, designed for severe intermittent service where frequent starts, stops and reversals are encountered on auto lifts, gate



valves, blast furnace mud guns, car spotters, etc.

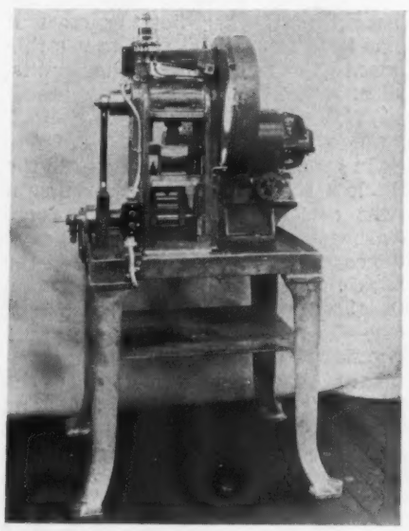
High resistance rotor provides high ratio of starting torque to starting current. Ball or sealed-sleeve bearings may be had with these motors, and they can be built with special mounting brackets or supplied with one or both brackets omitted for applications where frames are bolted directly to the driven machine. Frame is cast in one solid piece with feet cast integral.

Patented 2-Post Gate Guide Feature of Press

■ Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. has announced a new high speed press for blanking and forming or piercing on a quantity production basis.

It operates at speeds ranging from 300 to 900 revolutions per minute. All reciprocating parts have been reduced to minimum weight. Capacity is 4 tons. Patented 2-post gage guide, in which guide post bearings are located both above gate or slide and below dies, is claimed to provide excellent guiding.

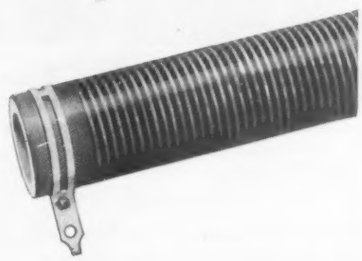
Blanker is driven by belt direct from motor pulley to flywheel, and provision is made for regulating speed by means of a standard variable speed device. It has pushbutton starter and is stopped either front or back by a handle which opens a limit switch in circuit and at same time applies the brake to inside of flywheel flange. Countershaft is counterbalanced and main bearings are provided with sight feed lubrication.



Introduces Resistors For High Voltage Use

■ International Resistance Co., 401 North Broad Street, Philadelphia, has developed resistors for high-voltage protective and measuring devices, employing a metallized type resistance element in a spiral formation on a ceramic base.

Resistors are available in five standard sizes, ranging from 4 watts, 5000 volts, 6000 ohms minimum, 150



megohms maximum on a tube 2 inches long and 9/16-inch diameter to a resistor having a rating of 150 watts, 100,000 volts, 0.35 megohm minimum, 10,000 megohms maximum, and measuring 18½ inches long and 2 inches in diameter.

Type MV high-voltage resistors will stand as high as 50 per cent voltage overload. Resistance values are maintained to plus or minus 5 per cent in general applications, although if mounted in ceresin wax, may be lowered to plus or minus 1 per cent. Temperature coefficient of resistors is from 0.02 to 0.05 per cent.

Streamlined Electric Drill for Light Duty

■ Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, announces a new light duty, ¼-inch electric drill, known as Thor Drillmaster. Drill weighs only 4 pounds and is 12 inches in length.

Drill is designed for general, intermittent service in maintenance and installation work. Because of its streamline design, it can be used conveniently in places hard to reach.

Unit can be furnished for 110 or 220 volts. Motor is universal type, operating on either alternating or direct current. Free speed of drill

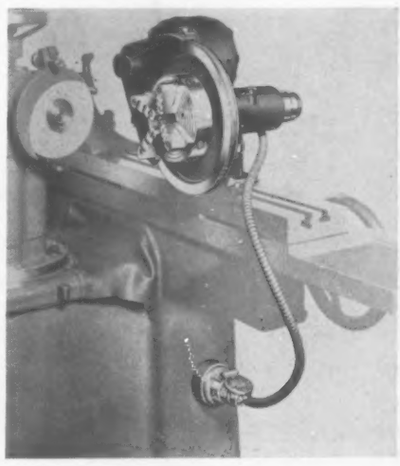
is 2000 revolutions per minute. Equipment includes ¼-inch, 3-jaw Jacobs chuck, grip handle with recessed, thumb control switch, 3-conductor cable with ground wire and plug. Oilless, self-lubricating bearings and special alloy steel gears cushion shock loads and provide quiet operation. Drill is priced at $19.95.

Adds Revolving Spindle Headstock for Grinder

■ Brown & Sharpe Mfg. Co., Providence, R. I., has introduced a revolving spindle headstock for use on its No. 10 cutter and tool grinding machine. This attachment provides a means of performing straight or taper cylindrical grinding.

Centers will swing work up to 10 inches in diameter and 17 inches in length. Miscellaneous chucking operations are made possible through provision of a 4-inch, 4-jawed independent chuck, which can be mounted on the face of the spindle pulley in place of the work driver.

Spindle unit is driven by a V-belt from a ¼-horsepower, constant-speed motor mounted on the headstock. Spindle speed is 300 revolutions per minute. Headstock swivels on its base and may be set at any angle in a horizontal plane. Rigid base is aligned accurately on the swivel table by means of two tongues.



Steel Barges Built on Modern Production Line

(*Continued from Page* 52)

watertightness and all interior and exterior painting is completed.

Barge, now weighing more than 150 tons, is raised on the transfer carriages and taken to position D through sliding doors at the end of the building. Doors open entire width of the building. At D, direction of movement is changed again so the vessel goes to position E where the transfer tracks overlap the launching ways sufficiently to enable transferring the vessel from the hydraulic carriages to the regular launching skids as shown in Fig. 5. Vessel then is launched sideways into the river in the usual manner with the customary splash and comes to rest ready for immediate service within 10 days after its start through the assembly line.

One of the chief benefits of indoor assembly line production is the ability to schedule deliveries accurately. Normal time for erection of the standard 175-foot coal barge described above is 10 days. This time can be shortened by using extra shifts. Work is entirely independent of weather and seasonable variations which not only guarantees schedule requirements but also increases efficiency of all operations.

A rush order of 25 coal barges, 140 x 26 x 10 feet, divided between the indoor assembly line and the standard outdoor erection location, showed just double the elapsed time per barge for the outdoor job working on the same identical barge in both locations simultaneously.

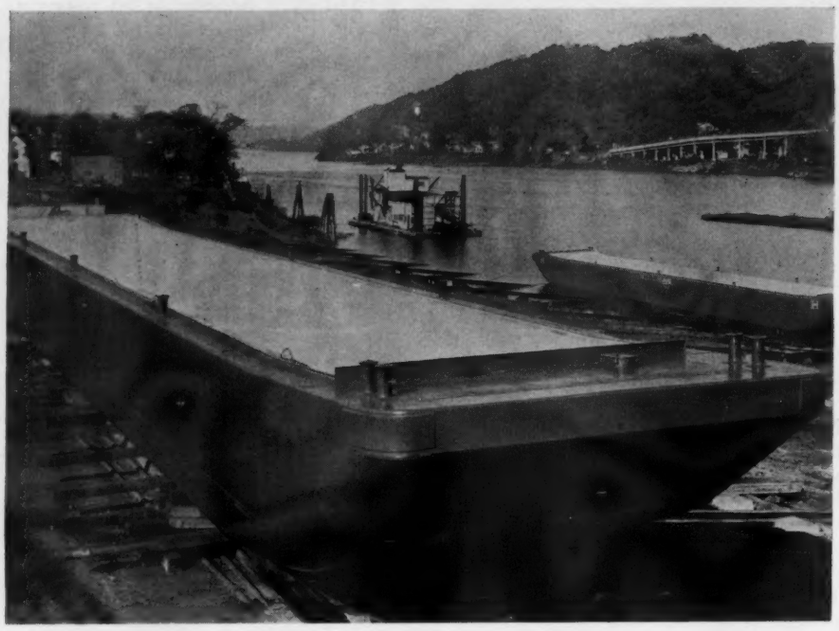


Fig. 5—Standard welded coal barge, 175 x 26 x 10 2/3 feet, in position on launching ways after transfer from hydraulic carriages

When the plant was designed the transfer carriages were recognized as a most important part of the system. Subsequent events have confirmed this theory. After the assembly plant had been in operation less than one year, an order for two, 1200 cubic yard capacity, all welded, bottom dump scows came up. Delivery was required in half the time previously used on riveted scows of lesser size. The only possible way to guarantee this unusual delivery time was to route the job through the assembly plant on a 24-hour day, 7-day week basis.

With this ability to garantee delivery, the order was secured and immediately a new problem arose. The transfer system had been designed to handle vesseis up to a maximum weight of 300 tons while the scows had a total weight of about 750 tons each, with a minimum weight of more than 600 tons to be erected indoors. The problem was solved quickly by adding several more transfer carriages to the system. To provide for future loadings of this nature, the added carriages were built with a capacity of 120 tons each instead of 60 tons as in the original installation.

The assembly plant described here was designed primarily for mass production of floating equipment but due to the variable demand for barges and other floating craft it has been found advisable to use this plant for fabricating other units, also.

Builds Dam Gates

In building spillway gates for the Pickwick and Guntersville dams it was decided that the most practical method for handling these heavy pieces would be to utilize the straight line method of production in the barge assembly plant where the hydraulic transfer carriages would be available for the moving about of these heavy loads. The Pickwick dam required 23 gates and the Guntersville dam 19. These 42 gates each have an upper and lower leaf, weighing 40 and 65 tons respectively.

These heavy sections were posi-

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LESCHEN WIRE ROPE
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Hemp Center
Wire Rope Center
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Seale - Filler Wire
Warrington

tioned during fabrication to secure the benefits of downhand welding. The straight line method of assembly fitted in nicely with this type of fabrication and the barge assembly plant equipment was quite sufficient for the handling of the loads involved.

One of the inherent qualities of the handling methods here is the high degree of safety provided. The permanent steel blocking throughout the plant is a long step forward from the normal outdoor operation which required removable timber blocking frequently supported on uncertain foundations. Risk to workmen when moving heavy loads is reduced to a minimum as the vessels are never lifted more than a few inches above the fixed steel blocking and the transfer carriages are provided with safety stops to catch the load if any leakage should develop in the hydraulic jacking system.

Helps Specifiers in Selecting Right Steel

■ Intended to eliminate guesswork that sometimes attends specification of machinery steels, a "Machinery Steel Selector" has been prepared to enable a steel specifier to determine which steel will suit his purpose, especially in the larger diameters. This selector shows tensile properties of machinery steels in ready-for-use condition, in all diameters up to 8 inches. Information also is given on machinability, comparative cost, heat treating, etc.

This selector is available without cost from Horace T. Potts Co., Philadelphia; Brown-Wales Co., Boston; Beals, McCarthy & Rogers, Buffalo; or Equitable Equipment Co., New Orleans. It applies to steels stocked by these companies.

Seek Causes of Metal Wear in Ceramics Plant

■ A second, revised edition of its bulletin entitled Wearing Properties of Some Metals in Clay Plant Operation has just been published by the engineering experiment station, Ohio State university, Columbus, O. It describes a series of tests made on machinery parts from muller tires, grinder runner plates, pug mill knives, repress die liners and grinder screen plates. Properties of metals in these parts and their behavior in various installations are outlined, and photomicrographs are used to show graphically how each metal reacted to wear. Copies of this bulletin may be obtained from the experiment station at 40 cents each.

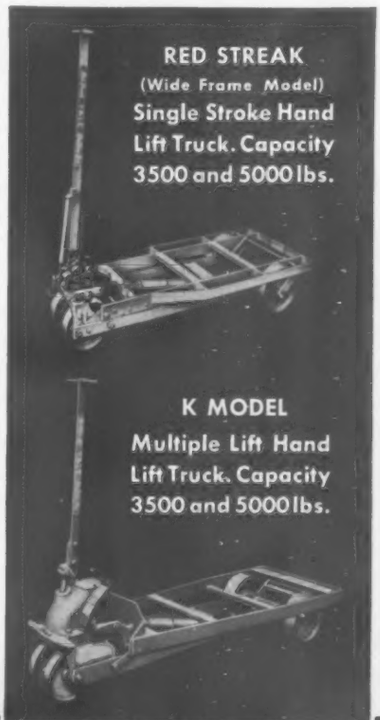
A YALE STORY OF SAFETY

That's what happens every time a load is lowered on a Yale Hand Lift Truck—Check and Double Check! For the Yale Release Check has a concentrated cushioning action that makes it doubly efficient—a safety factor that always protects load, truck, operator and floor.

In order to make this check as perfect as possible, Yale engineers have considered every mechanical factor. That's why it's placed in the center of the truck where load strains are uniformly balanced—and is protected from injury by a heavy channel cross member.

It also features a high carbon ground piston rod guided in a bronze bushing. This is one piston rod which will not buckle! In addition, there is an extra capacity oil reservoir with an automatic oil seal that prevents leakage. Once the oil is in, it stays there. And as a final indicator of the Yale Release Check's quality manufacture, there is the highly precisioned automotive type piston ring.

With this check on the job the load is never dropped—It's gradually lowered!

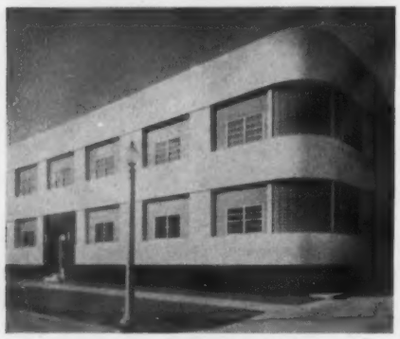

RED STREAK
(Wide Frame Model)
Single Stroke Hand Lift Truck. Capacity 3500 and 5000 lbs.
K MODEL
Multiple Lift Hand Lift Truck. Capacity 3500 and 5000 lbs.

YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

NEW METAL PRODUCTS

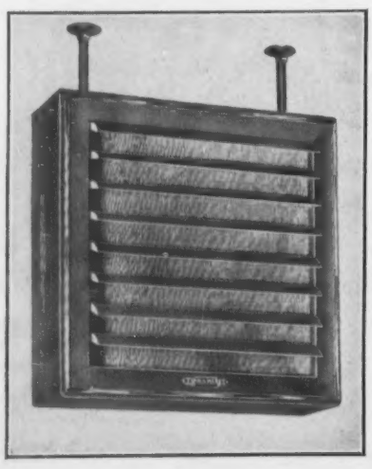
■ Adaptability of enameled iron to both new construction and remodeling is illustrated in the recently



completed enlargement of the research laboratory building of American Stove Co., St. Louis. Approximately 5200 square feet of architectural porcelain enamel were used on the front and sides of the building. Armco enameling iron, 16 and 18-gage, was chosen for this job. Color scheme is ivory with black trim.

■ Housed in a sturdy, die-formed, streamline steel frame, a new Kramer unit heater, recently brought out by Trenton Auto Radiator Works, Trenton, N. J., is an attractive addition to this company's line of air-conditioning equipment.

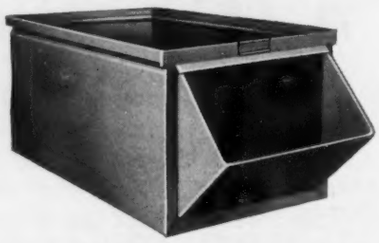
Frame is finished in gray crackle baked enamel, designed to blend with finished interiors. Unit is brightened by stainless steel trim on the front and sides, and stainless steel louvers may be had at extra cost. Condensing coil consists of a series of horizontally placed hairpin tube bends, oval in cross-section, with one end of one leg brazed into a cylindrical steam supply manifold and the other end into a return manifold. Fins are fused to the tubes to increase transfer of heat. Entire heating element is copper.



Integral with back of the frame is a die-formed air inlet housing the four-blade fan. Unit is powered by a totally enclosed motor. It may be used with any steam pressure up to 150 pounds.

■ Steel stacking boxes, with stacking rim on all four sides, are being manufactured by Pollard Bros. Mfg. Co., 5510 Northwest highway, Chicago. Rim is an integral part of the box and is made by a series of bends in the steel itself. All corners are reinforced by steel bands.

Included in this line are open-end stacking boxes for use in place of factory shelving and for transporting parts to assembly lines. Boxes are obtainable in a wide range of



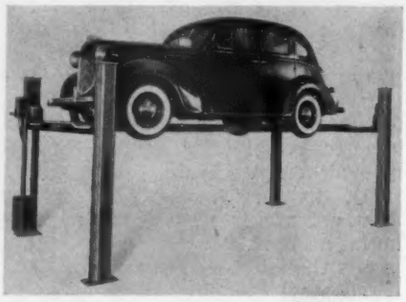
sizes and in steel ranging from 16 to 22-gage. Standard stacking box is equipped with either a rigid handle or a drop handle, as desired.

■ Designed to enable the working man to carry a complete warm dinner instead of cold lunch, an electrically heated lunch box has been introduced by the Dinette Lunch Box Co., Algonac, Mich.

Box is similar in outside appearance to a conventional lunch box, but its interior is divided into two insulated sections. In the upper section are three covered aluminum trays for foods which are to be heated. The lower section is for fruit and other cold foods. Each aluminum tray will hold 12 ounces. A thermostat controls temperature, so food will not burn or stick to containers.

Time required for heating a complete dinner is approximately 15 minutes at a current cost of about 1/12-cent. Unit is simply plugged into a standard 110-volt outlet, or a special lunch box may be obtained for operation from a 6-volt battery.

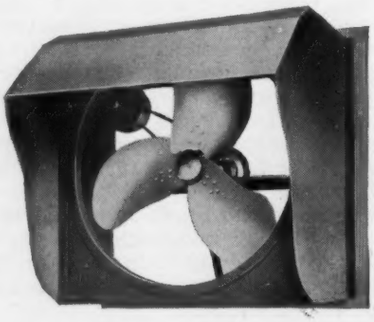
■ Simplicity of design, increased safety and ease of installation are three features of a four-post electric lift for automobiles developed by



Curtis Pneumatic Machinery Co., St. Louis.

Lift consists of a platform, either free-wheel or roll-on type, with long cross heads which slide on the inner flanges of four independent, double angle columns which rest on floor plates. Bases of columns locate over pins welded in the floor plates in such a manner as to permit each post to be self-aligning. Lifting cables operate on four winding drums which are cross-connected by square shafts, beveled gears and flexible couplings and are driven by an electric motor through a worm gear reduction. A positive brake prevents coasting. Over 2200 pounds of steel goes into the manufacture of each of these lifters.

■ Designed to provide effective cooling of large homes or apartments, a new apartment model fan has been introduced by Chelsea Fan & Blower Co., 370 West Fifteenth street, New York. Blades are all steel, die-cut and die-formed. Steel frame has welded construction and is light enough to permit easy installation. Fan is furnished in two sizes, 24 and 30-inch. Fan rotation is at very slow speed, and blades are designed to deliver a large volume of air without excessive noise. A metal awning thoroughly protects the motor from outside conditions, and fan is finished in durable weatherproof paint.



Dr. Desch Re-named Head Of British Institute

■ Dr. C. H. Desch, superintendent, metallurgical department, National Physical Laboratory, Teddington, Eng., was re-elected president of the Institute of Metals for a second term at the organization's thirty-first annual general meeting in London, March 8-9. Featuring the meeting was the report of the secretary, G. Shaw Scott, stating that institute membership of 2252 on Dec. 31 was the highest on record.

Lieut.-Gen. Sir Ronald Charles, director, British Aluminum Co. Ltd.; Kenneth Gray, director Mellowes & Co. Ltd.; and Lieut.-Col. J. H. M. Greenly, deputy chairman, Babcock & Wilcox Ltd., were named vice presidents for 1939-40.

Elected as council members were: Sir Harold Carpenter, professor at the Royal School of Mines, and past president of the institute; Maurice Cook, research manager, I. C. I. Metals Ltd.; W. C. Devereux, managing director, High-Duty Alloys Ltd.; A. J. Murphy, chief metallurgist, J. Stone & Co. Ltd.

Medal Presented

The Institute of Metals platinum medal, gift of the Mond Nickel Co., was presented to Sir Harold Carpenter. First award of this medal, offered annually for outstanding services to nonferrous metallurgy, whether on the practical or scientific side, without restriction of nationality or membership in the institute, was made in 1938 to Sir William Bragg, president of the Royal society.

In presenting the medal, President Desch recalled the services rendered by Sir Harold, both as a teacher and as a great investigator. He mentioned that he was the first scientist to be entrusted with the post of superintendent of the metallurgical department, National Physical Laboratory, and during his tenure was responsible for two or three outstanding metallurgical reports.

Accepting the medal, and referring to his own work, Sir Harold reviewed developments in physical metallurgy during the past 40 years. He mentioned that the pyrometer and microscope are still tools of current use, but more recently two new weapons have been coming into their own. One is x-ray examination, without which it is probable that we should not have today such as understanding of the intimate constitution of metals and alloys; the second is the electrical diffractional method of investigation, which gives valuable information on the surface behavior of metals.

Other sessions of the meeting were devoted to presentation and discussion of 13 technical papers on nonferrous metals. Autumn meeting of the institute will be held in Glasgow, Sept. 5-9.

Power Supply Systems For Resistance Welders

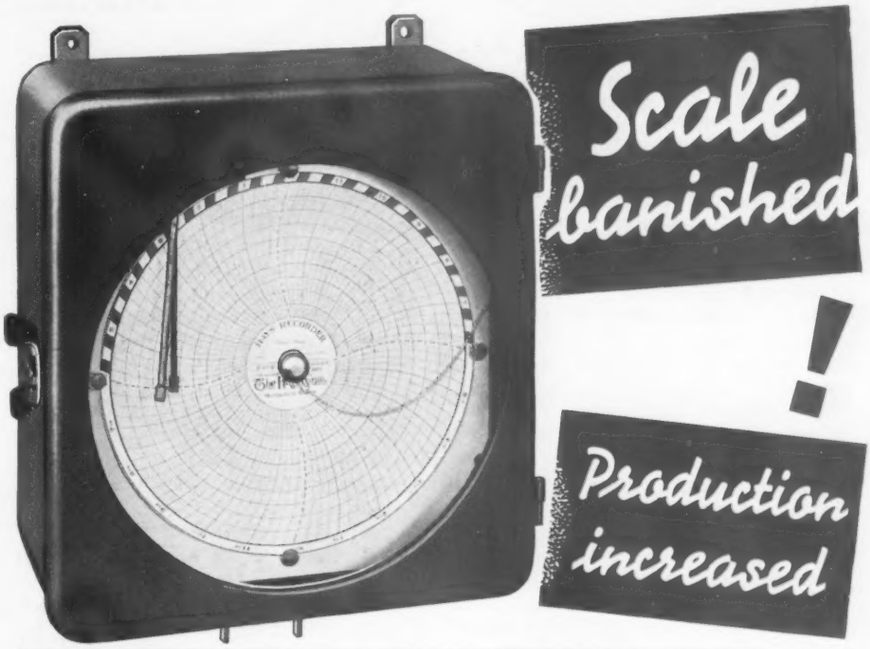
(*Continued from Page* 64)

age can be controlled more readily when peak loads are not greatly in excess of the normal capacity of the generator.

The rated power factor of welding generators will range from 30 per cent for spot welders to between 60 and 70 per cent for butt and flash welders.

There are some applications where it is desired to operate more than one welder from a single generator. Two or more spot welders with electronic timers may be operated from a single generator of minimum capacity if an electronic synchronizing device is used. This permits only one welder to be energized at a time. Such an arrangement introduces no appreciable delay in production since each welder in turn is locked out only a fraction of a second.

In addition, there is at least one



A SLAB MILL had serious trouble with a dense scale that the high pressure sprays could not knock off. A Hays Supersensitive OT Draft Recorder was installed which revealed a large amount of oxygen being fed into the furnace during the charging period. The pressure was adjusted to plus 5/100 in., water-scale was practically eliminated and production noticeably increased.

Two draft values, two pressure values, two differential values, or a combination of any two of these three values may be recorded. These "OT" Recorders are sensitive enough to register accurately increments of .0025 in. water yet are husky enough to stand up under the jars and dirt of steel mill operation. Write to 960 Eighth Ave., Michigan City, Ind. for Bulletin 37-232.

The HAYS CORPORATION
SINCE 1901
COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A.

installation in successful operation where two welders are operated simultaneously from one generator. Each welder is controled by a contactor and each main contactor is interlocked with a field-forcing contactor so generator field strength is approximately proportional to the varying load.

♦

Installs Up-to-Date 44-Inch Blooming Mill

(*Concluded from Page* 44)

start-and-stop motor. It is self-contained, the rear end being hinged and the front end linked to a vertical hydraulic cylinder.

For dividing the blooms and slabs coming from the 44-inch and 34-inch mills, a patented shear of novel design has been furnished as part of this contract. Fig. 2 shows this massive machine.

The shear proper consists of a bottom knife block, a top knife block, a crankshaft centered in the bottom knife block, a pin in the top block and two interconnecting links which absorb all the shearing stresses. A simple frame takes up the external torsional moment. Power is transmitted to the crankshaft from an independently mounted gear drive through a universal spindle.

In operation, the top knife block first descends on the material to be cut, thereby forming a simple gag. Then, in completing the stroke, the bottom block, so to speak, pulls itself up by its own boot straps. It is evident that the actual cutting stroke is limited to the thickness of the material which is to be cut, plus the small overlap of the knives. The simplicity and easy accessibility of all parts of this machine are clearly shown in Fig. 2. The whole arrangement is exceptionally sturdy and makes a neat appearance. Modern lubrication methods protect the crankshaft from scale intrusion. The guides are protected by guards which form an integral part of the bottom block. The compactness of the mechanism forms a minimum of obstruction to the view over and around the shear.

This shear can exert a pressure between the knives of two million pounds.

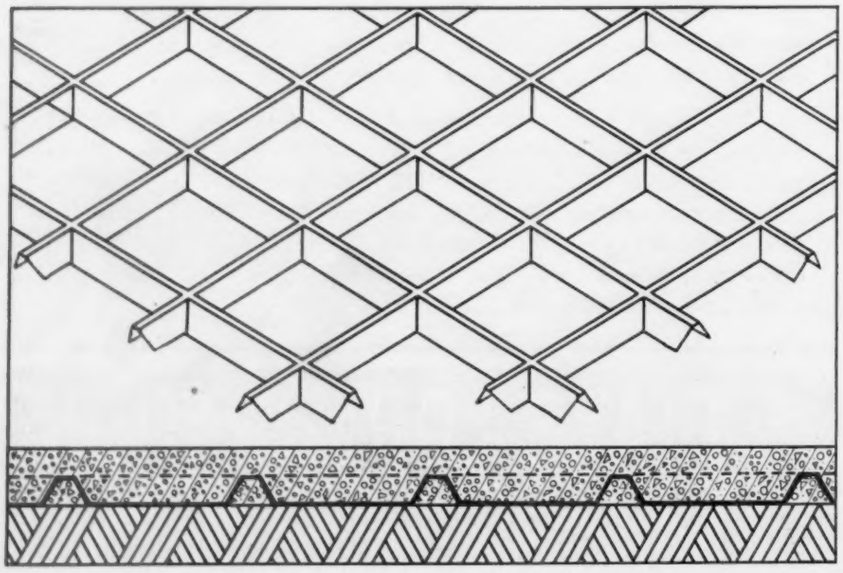
Reinforces Roads With Steel Binder

■ BY INTERCEPTING and deflecting dead weight, a newly designed rigid steel subgrade and surface binder, invented by Joseph E. Willetts, Atlantic City, N. J., is said to prevent highway cave-ins from subsoil seepage and to diminish concussion.

With this binder the entire 4-inch depth of subgrade concrete is divided into 3-foot, steel-encased squares. This arrangement is designed to prevent unequal shrinkage of wet cement, a factor in surface cracking. It presents a rigid surface binder of beveled steel squares, which dissipate deadweight impact by transmitting it in all directions before it reaches the ground. A light steel is used to form these squares, but the construction of the binder is said to provide strength equal to that of heavier steel.

Binder is designed to provide maximum reinforcement at a minimum cost, said by the inventor to be less than $10,000 per mile of 20-foot highway. A heavy truck, running along at 50 miles per hour, it is claimed, automatically prepares the road in advance of it for its own excess load by distributing impact throughout a large section of the rigid binder.

Upper diagram shows construction of beveled steel squares which form the combined subgrade and surface binder. Lower drawing is cross-section of a concrete highway showing binder's position



Foundrymen Plan First Conference at Rutgers

■ Foundrymen of New York, New Jersey and eastern Pennsylvania will attend the first regional conference at Rutgers university, New Brunswick, N. J., April 1. The event is sponsored by the Metropolitan Philadelphia and Metropolitan New York-New Jersey chapters, American Foundrymen's association, and the university's department of mechanical engineering.

The program includes morning and afternoon technical sessions, a luncheon, and a dinner at Roger Smith hotel. Edwin C. Barringer, executive secretary, Institute of Scrap Iron and Steel Inc., New York; and Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and president, American Foundrymen's association, will speak at the dinner.

Papers scheduled for the technical sessions are: "Castings from the Consumer's Viewpoint," by N. L. Mochel, Westinghouse Electric & Mfg. Co., Philadelphia; "Castings from the Producer's Viewpoint," by J. C. Pendleton, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; "Casting Defects as Affected by Sands," by W. G. Reichert, Singer Mfg. Co., Elizabeth, N. J.; and "Casting Defects as Affected by Gates and Risers," by H. H. Judson, Goulds Pumps Inc., Seneca Falls, N. Y.

Test Masonry Specimens For Structural Strength

■ In connection with its program on the determination of structural properties of low-cost house constructions, the masonry construction section of the national bureau of standards, Washington, recently built specimens representing six masonry wall constructions utilizing brick, structural clay tile and concrete units. These specimens were subjected to compressive, transverse, concentrated, impact and racking loads. Deformation under load and the set after the load was removed was measured for uniform increments of load.

Results of these tests are described and presented graphically in Report BMS5, copies of which may be obtained from the bureau.

Demand Hesitant; Operations Slip

Outlook Fair Though Recent Gains Less Than Expected

MARKET IN TABLOID ★

Demand

Spotty, generally unchanged.

Prices

Holding; scrap steady or higher.

Production

Down 1 point to 55½ per cent.

■ STEEL business this month has fallen short of expected levels. Demand shows further small gains in some directions, but hesitancy is noted in others, and ingot production has slipped 1 point to 55½ per cent.

Sufficient business is at hand and in prospect to prevent any marked letdown in operations immediately. In fact, some producers look for better business next quarter than during the current period. Production of rails and tin plate will help to sustain steelmaking in April and May, while requirements of building and engineering construction, shipbuilding and the automotive industry also will provide considerable support.

Some unsettlement in steel markets is attributed to foreign developments. In spite of this, activity in eastern markets is tending to expand. This reflects partly the government rearmament program which is aiding not only builders of heavy machinery but also smaller companies, such as makers of light stampings. At the same time private industry is busier and is giving tangible evidence in an increasing amount of small industrial construction programs.

In most other districts business shows little change from the volume a month ago. Tin plate demand has improved more slowly than was anticipated, but production is up to 60 per cent and can requirements of packers are counted on for additional increments in coming weeks.

An English producer has received a contract for 5,000,000 boxes of tin plate for delivery over the next five years to American Can Co. of Canada, according to foreign reports. The business is said to have been obtained in the face of keen competition from mills in this country.

Auto Production At 1939 High; Steel Buying Slow

Steel orders from the automotive industry continue small in most instances, although some partsmakers are more active. Motorcar assemblies last week reached a new peak for the year at 89,400 units, a gain of 2675 over the preceding week and more than 57 per cent larger than a year ago. This latest upturn resulted from an increase by Ford from 17,950 units to 22,350. General Motors dropped from 36,515 to 35,230; Chrysler was practically unchanged at 20,825; while all others curtailed from 11,690 to 10,995,

Except for an order from the Wabash for 7500 tons of rails, little new business has appeared from railroads. Action still is awaited on the contemplated purchase of a fairly large volume of equipment by various roads.

Public building projects still figure prominently in structural shape and concrete reinforcing bar markets. Shipbuilding also continues an important outlet for heavy steel products. About 13,000 tons of steel will be required for a navy airplane carrier on which bids recently were taken, while a St. Louis barge line has ordered 15 barges involving 5800 tons.

Steel exports are steady but are lagging behind the 1938 volume. February shipments, excluding scrap, totaled 134,777 tons, compared with 134,788 tons in January and 203,850 tons a year ago. Scrap exports declined from 93,096 tons in January to 90,136 in February.

Warehouse Business Shows Small Gain Over February

Warehouse sales of steel products so far this month are slightly ahead of the February rate. Minor revisions have been made in warehouse prices and quantity differentials in some districts. Mill quotations generally are steady, one change being a new simplified list of discounts on bolts and nuts. This result in little variation in net prices from former levels.

Last week's 1-point drop in steel ingot production leaves output well ahead of the 35-per cent prevailing a year ago. Responsible for the lower output were reductions of 2 points to 48 per cent at Pittsburgh, 10 points to 63 per cent at Wheeling, 2 points to 52½ at Cleveland and 4 points to 72 at Detroit.

Buffalo increased 4 points to 37½ per cent, while other districts were unchanged. These included Chicago at 56½, Birmingham at 78, Cincinnati at 55, St. Louis at 57½, Youngstown at 54, eastern Pennsylvania at 40 and New England at 65.

Scrap markets are less buoyant in certain areas, but prices are steady or higher. An advance in the East has raised the scrap composite 8 cents to $15.04. The finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Mar. 25	Mar. 18	Mar. 11	One Month Ago Feb., 1939	Three Months Ago Dec., 1938	One Year Ago Mar., 1938	Five Years Ago Mar., 1934
Iron and Steel	$36.42	$36.39	$36.39	$36.37	$36.36	$38.80	$31.38
Finished Steel	56.50	56.50	56.50	56.50	56.50	61.70	51.10
Steelworks Scrap..	15.04	14.96	14.96	14.87	14.77	13.20	12.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	March 25, 1939	Feb. 1939	Dec. 1938	March 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	March 25, 1939	Feb. 1939	Dec. 1938	March 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	85.27	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.65	$15.50	$13.65
Heavy melt. steel, No. 2, E. Pa.	13.75	13.25	13.20	12.75
Heavy melting steel, Chicago	14.25	14.00	13.85	12.20
Rails for rolling, Chicago	17.25	17.25	17.75	15.25
Railroad steel specialties, Chicago	16.25	16.00	16.05	14.25

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c
Iron	
Chicago, Terre Haute	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c
Reinforcing	
New billet, straight lengths, quoted by distributors	
Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.22c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45
(Per pound)	
Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00
To Manufacturing Trade	
Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)	
Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.	
Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.80c
Detroit, delivered 2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 150-4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(*Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c
	Cleve.
Carbon	Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Cents per pound	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
7/16—1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
7/16-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 *to* 9 x 9-*in., base*

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to 9/32-inch incl.	43.00
Do., over 9/32 to 11/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	. ...
St. Louis from Birmingham	†21.12	....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$40.00
Joliet, E. Chicago	49.00
Birmingham, Ala.	40.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained

	Carloads	Ton lots	Less ton
chrome			16.50c
Do., ton lots			17.25c
Do., less-ton lots			17.75c
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $68.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.61
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.33
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	4.75
San Francisco	3.65	4.05	6.00	3.60	3.60	5.20	3.60	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	3100
Boston	3.61	4.18	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.14	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.11	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.10	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.70	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	3.80	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.85	3.58	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.05	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.39	4.00	7.80	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	3.93	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.44	....	....	....	....	....	....	....
Tulsa, Okla	....	4.84	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.50	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, March 23

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.45 5 0 0	$17.25	2 0 6
Basic bessemer	....	15.98	1 17 6
Hematite, Phos. .03-.05	26.97 5 15 0*	.....	.....
Billets	$34.59 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.35 11 7 6	42.60	5 0 0
Standard rails	$44.56 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.85c to 1.95c	4 15 0 to 5 0 0
Structural shapes	2.09c 10 0 0	1.85c to 1.90c	4 15 0 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.93c	7 10 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.61c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c	5 0 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	.....	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.22	4 19 0(a)	$17.44	620.50	$15.17	450	$25.24 63
Basic bess. pig iron	21.69	4 12 6(a)	.....	...	.....	...	27.85(b) 69.50
Furnace coke	5.39	1 4 2	5.96	225	7.25	215	7.61 19
Billets	34.59	7 7 6	25.04	945	28.98	860	38.67 96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c 132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.61c	17 5 0	3.12c	2,600	4.13c	2,750	6.66c 370
Plain wire	4.08c	19 10 0	1.92c	1,600	2.48c	1,650	3.11c 173
Bands and strips	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	14.00-14.50
Chicago, auto, no alloy	12.50-13.00
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	12.00-12.50
Cleveland, No. 1	14.50-15.00
Cleveland, No. 2	13.50-14.00
Detroit, No. 1	10.50-11.00
Detroit, No. 2	9.50-10.00
Detroit (industrial)	11.00-11.50
Eastern Pa., No. 1	15.50-16.00
Eastern Pa., No. 2	13.50-14.00
Federal, Ill.	11.75-12.25
Granite City, R. R.	12.00-12.50
Granite City, No. 2	11.00-11.50
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.75-16.00
Pittsburgh, No. 2	14.75-15.25
St. Louis, R. R.	12.25-12.75
St. Louis, No. 2	11.00-11.50
San Francisco, No. 1	12.00
Seattle, No. 1	12.00
Toronto, dlrs. No. 1	9.50- 9.75
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	13.00-13.50
Chicago, dealer	12.00-12.50
Cincinnati, del.	11.25-11.75
Cleveland	14.50-15.00
Detroit	12.00-12.50
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.75-16.00
St. Louis	10.00-10.50
Valleys	14.50-15.00

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.75-15.25
St. Louis	7.50- 8.00
Toronto, dealers	3.50

SHEET CLIPPINGS, LOOSE

Chicago	10.50-11.00
Cincinnati, dealers	7.25- 7.75
Detroit	8.75- 9.25
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.25- 8.75
Cincinnati, No. 2	3.75- 4.25
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1, new	10.50-11.00
Valleys, new, No. 1	14.25-14.75
Toronto, dealers	4.00- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	6.75- 7.25
Cincinnati, dealers	5.00- 5.50
Cleveland	7.50- 8.00
Detroit	6.00- 6.50
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.75-10.25
St. Louis	3.00- 4.00
Toronto, dealers	4.00- 4.50
Valleys	9.50-10.00

SHOVELING TURNINGS

Buffalo	7.25- 8.00
Cleveland	8.00- 8.50
Chicago	8.50- 9.00
Detroit	6.75- 7.25
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.00- 7.25
Cincinnati, dealers	3.50- 4.00
Cleveland	8.50- 9.00
Eastern Pa.	6.50- 7.00
Detroit	6.25- 6.75
New York	†2.50- 3.00
Pittsburgh	8.75- 9.00
Toronto, dealers	5.00- 5.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	14.00-14.50
East. Pa., elec. fur.	13.50
St. Louis	9.50-10.00
Toronto	4.25- 4.50

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.50- 8.00
Chicago	6.00- 6.50
Cincinnati, dealers	3.50- 4.00
Cleveland	8.50- 9.00
Detroit	6.25- 6.75
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	4.00- 4.25

RAILROAD SPECIALTIES

Chicago	16.00-16.50

ANGLE BARS—STEEL

Chicago	16.00-16.50
St. Louis	13.75-14.25

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	15.75-16.25
Eastern Pa.	17.00-17.50
Pittsburgh	18.00-18.50
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.50-17.00
Chicago (2 ft.)	17.00-17.50
Cincinnati, dealers	17.00-17.50
Detroit	17.00-17.50
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.25-18.75
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.00-17.50
St. Louis	13.75-14.25
Seattle	16.00

FROGS, SWITCHES

Chicago	14.00-14.50
St. Louis, cut	13.75-14.00

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.00- 9.50
Cincinnati, dealers	7.25-7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.25- 7.75
Eastern Pa.	13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	10.00-10.25

FORGE FLASHINGS

Boston district	†8.50
Buffalo	12.00-12.50
Cleveland	12.00-12.50
Detroit	10.50-11.00
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	19.00-19.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.50-17.00
Eastern Pa.	17.50-18.00
Pittsburgh	18.00-18.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	18.00-18.50
Eastern Pa.	21.00-21.50
St. Louis	18.00-18.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†15.25-15.75
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.50-18.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	18.00-18.50
St. Louis, iron	14.50-15.00
St. Louis, steel	14.50-15.00

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†10.50-10.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	13.00-13.50
Chicago, rail'd net	11.50-12.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	14.00-14.50
Cleveland, mach.	17.00-17.50
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-13.00

HEAVY CAST

Boston dist. break.	†9.75
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break.	10.50-11.00
Eastern Pa.	15.00-15.50
Los Ang., auto, net.	13.00-13.50
New York, break.	†10.50-11.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.00- 8.50
Cincinnati, dealers	7.25- 7.75
Detroit, net	8.00- 8.50
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.50-16.00
Cincin., agri. deal.	12.50-13.00
Cleveland, rail	15.50-16.00
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	9.00- 9.50
Tungsten, sh. ton unit, duty pd. nom.	20.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	26.00-27.00
So. African, 50-52% nom.	26.00-27.00
Indian, 49-50%	26.00

—The Market Week—

Sheets, Strip

Sheet and Strip Prices, Pages 78, 79

Pittsburgh—Sheet and strip production is steady, with orders over the past week slightly better, but behind February on a daily average.

National production, however, moved up one point on common and full finished sheets while both hot and cold strip estimates moved down a point. Currently the sheet rate is slightly better than 55 per cent, while cold strip mills average about five points higher than the hot mills, slightly above 40 per cent of capacity.

Steady buying from automotive builders forms a solid base for the sheet market. There is a good possibility of increasing tonnage from these sources as the industry moves up toward its announced spring program of 100,000 cars weekly.

Cleveland — Flat-rolled steel demand is barely holding its own. Automotive orders and releases still are restricted, recent gains in assemblies finding no reflection in purchases by motor car interests. In some instances parts suppliers have curtailed steel shipments. Demand elsewhere is well sustained, needs of some miscellaneous users having shown moderate improvement lately. Forward buying is held at a minimum by practically all consumers.

Chicago—Requirements of sheet and strip users are fairly steady, but absence of anticipated improvement in demand is disappointing. Some hope is held for better business next quarter, with heavier purchases expected by the automotive industry in connection with final 1939 runs. Demand from the latter recently has been limited to small lots.

Boston—Demand is slightly improved, with jobbers placing fill-in orders in slightly better volume. Industrial and miscellaneous requirements fail to show much improvement.

New York—Sheet buying has failed to reflect the improvement trade leaders anticipated earlier in the month. Producers generally still indicate intention of putting the new extras scheduled into effect April 1. So far, however, consumers who stand to benefit under the existing extras have shown no disposition to lay in extra stocks.

Philadelphia—Activity in lighter gage sheets, mostly under 17 gage, is gaining with leading outlets, including automotive, roofing, stove, barrel and commercial refrigeration. Some stamping plants are operating above 70 per cent. It is understood mills will eliminate allow-

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ance for overweight to customers, effective April 1.

St. Louis—The sheet situation is quiet, with expected seasonal betterment little in evidence. Enameling stock is moving somewhat more actively, with refrigerator and stove manufacturers specifying more freely. Heavier gages of galvanized sheets show no improvement over recent quiet conditions. Tin plate has also failed to respond to seasonal factors in the degree expected.

Birmingham, Ala.—Bolstered by continued inquiries and consistent sales, production of sheets continues at virtual capacity. Demand for sheets remains fairly evenly divided between manufacturers and roofing. Strip is being turned out in small quantities to suit production schedules elsewhere.

Plates

Plate Prices, Page 78

Pittsburgh — Plate buying has been light in this district recently although some new projects are appearing. First barge work of importance requires 5800 tons for 15 barges to be built by American Bridge Co. for Mississippi Valley Barge Line Co., St. Louis. They will have cargo houses 30 x 180 feet, 9 feet high on hulls 35 x 198 feet, 11 feet deep.

Chicago—Demand for steel plates continues at the better level recently established. Construction work in the West requires a larger proportion of plates than formerly and carbuilding is also bringing considerable tonnage to mills.

Boston—With specified work taking close to 1000 tons, part of which now is being figured, plate requirements are slightly heavier. Structural, boiler and other shop work shows little gain, with releases for shipyard needs well maintained.

New York—Plate demand appears to be little more than holding its own at the restricted average rate of the past several weeks. Little new ship construction has been awarded this month, although releases from shipyards are satisfactory and bids are scheduled to be opened by the navy March 29 on 833 tons of armor plate.

About 13,000 to 14,000 tons of steel will be required for the airplane carrier on which the Newport News Shipbuilding & Dry Dock Co., that city, recently was the only bidder.

Philadelphia — Baldwin Locomotive Works has distributed 1500 tons of plates for 28 locomotives recently booked. Additional locomotive activity is anticipated as the year progresses. Specifications from car builders are also improving. Makers of large tanks are busier but small tank makers are less active. Several round lots have been released by shipbuilders. Export demand is more active with Holland and Scandinavia in the market but prices are not attractive.

Birmingham, Ala. — Output of plates remains at approximately 75 per cent of capacity with some accumulation of stock in evidence. Miscellaneous demand is comparatively strong. Specifications for current shipbuilding needs are expected to be made public soon.

Seattle—Inquiry for materials for large projects is small but shops specializing in light plates and sheet metal jobs report active spring business. Several tank contracts involving less than 100 tons have been placed with local fabricators. United States engineer, Seattle, has received figures for construction of a 163-foot steel, stern wheel steamer, calling for about 200 tons. Petroleum Navigation Co., Seattle, has taken no action on bids recently submitted for building a 140-foot motor tanker.

San Francisco—Bids have just been opened on 500 tons of plates for the bureau of reclamation for delivery at Sacramento, Calif., and bids open March 31 for close to 700 tons for an 8 and 12-inch welded steel, lapweld or steel pipe line for Fallbrook, Calif. Bookings aggregate 1086 tons and brought the total for the year to 14,779 tons, compared with 11,761 tons for the same period a year ago.

Plate Contracts Placed

5800 tons, for Mississippi Valley Barge Line Co., St. Louis, for 15 barges, to be built by American Bridge Co., Pittsburgh.

500 tons, pipe line, Bethlehem, Pa., to Bethlehem Steel Co., through Kaufman Construction Co., Philadelphia.

250 tons, four 600-pound boilers, specification 9074, Pearl Harbor, T. H., to unnamed interest.

240 tons, discharge pipes, Flathead irrigation project, Montana, to Western Pipe & Steel Co., San Francisco.

100 tons, 30 by 100-foot standpipe, Bellingham, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Unstated tonnage, four steel barges for Great Lakes Dredge & Dock Co., Chicago, to Manitowoc Shipbuilding Corp., Manitowoc, Wis.

Plate Contracts Pending

9000 tons, approximately, airplane carrier, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., only bidder; between 13,000 and 14,000 tons of steel are required in all.

678 tons, 8 and 12-inch welded steel, lapweld or tubing, Fallbrook, Calif.; bids March 31.

500 tons, bureau of reclamation, invitation 33,119-A-1, for delivery at Sacramento, Calif.; bids opened.

200 tons or more, including shapes, 163-foot stern wheel, snag steamer; bids in to United States engineer, Seattle.

Pipe

Pipe Prices, Page 79

Cleveland—Some cast pipe interests have backlogs for 30 days. Miscellaneous lots under 100 tons continue to appear in encouraging volume. J. B. Clow & Sons Co., Cleveland, recently booked 150 tons for a water distribution system, Bowerstown, O. Conneaut, O., is asking bids March 31, for a water distribution project requiring 200 tons. Bids on a similar project go in April 4, for Mansfield, O., 100 tons.

Chicago—Aside from 1438 tons of cast iron pipe for the department of public work, bids March 30, there is little activity in this market. This is believed to be intended for replacements necessitated by subway construction. Usual spring buying for municipalities in this district has not materialized.

New York—Sellers of commercial pipe look for improvement, although relatively few large plumbing and heating contracts are active at the moment. Buying this month has proved generally disappointing to sellers, some of whom report business less satisfactory than in the corresponding period in February. There has been little recently to test the market but it appears that efforts to firm up prices are meeting with some results.

About 1000 tons of tubing will be required for the aircraft carrier on which Newport News Shipbuilding & Dry Dock Co. is the only bidder. Several fair size tonnages are pending for heating and plumbing work on various building projects in the district.

Birmingham, Ala.—Pipe production is on the most active basis of the past few weeks with schedules being maintained at 3 and 4 days a week and with numerous inquiries out, both private and government, indicative of some comparatively large tonnage for the near future.

Seattle — Sales are mostly less than 100-ton lots and no important projects are up. H. G. Purcell, Seattle, will furnish 135 tons of 16 inch Class 150, cast iron for the Canada Drive improvement at Seattle. Pasco, Wash., has received figures for a small tonnage of 4 and 6-inch cast iron pipe.

San Francisco—Bids on the second largest inquiry of the year will be opened April 10 by Oceanside, Calif., over 1100 tons of 12 to 18-inch cast iron pipe, concrete or transite pipe. Awards totaled only 388 tons, bring-

ing the year's aggregate to 6641 tons, compared with 7285 tons for the corresponding period in 1938.

Cast Pipe Placed

135 tons, 16 inch, Canada Drive improvement, Seattle, to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

126 tons, 6 and 8-inch, Burbank, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

150 tons, water distribution system, Bowerstown, O., to J. B. Clow & Sons Co., Cleveland.

Cast Pipe Pending

1438 tons, 4 and 8-inch, department public works, Chicago; bids March 30.

1000 tons, 12 to 14-inch, cast iron, concrete or transit pipe, Oceanside, Calif.; bids April 10.

200 tons, water distribution system, Conneaut, O.; bids March 31.

115 tons, 4 to 8 inch, with alternates, district 17, Seattle; bids in.

100 tons, water distribution system, Mansfield, O.; bids April 4.

Bars

Bar Prices, Page 78

Cleveland—Sellers of commercial and alloy steel bars note little change in current demand. Shipments have improved only slightly over the corresponding period during February. Demand from machine tool builders and agricultural implement manufacturers continues to expand at a slow but steady pace. Little consumer interest has been noted in the revised quantity extras.

Chicago—Demand is quieter but remains fairly heavy. Automotive buying is light, with little prospect seen of immediate improvement. Improved ordering by tractor interests is indicated soon.

Boston—Small-lot releases for alloy bars are up moderately, but merchant bar demand still drags. Small tool and machine tool builders are placing fair business.

New York—Business in alloy and cold-drawn material is outstanding in the bar market. Government shops lately have been specifying less freely, but good demand is coming from machinery builders, airplane manufacturers and shipbuilders. Automotive accessory interests have been buying more actively. Carbon steel bar demand is relatively quiet.

Philadelphia—Demand for steel bars is fairly steady with hot alloy and cold-drawn specifications moving better than hot carbon grades. Bright spots include light agricultural equipment builders, textile machinery manufacturers and material handling equipment makers.

Birmingham, Ala.—Demand is active, especially for concrete reinforcing bars, a considerable tonnage of which is going into highway construction. Agricultural implement manufacturers also are taking better tonnage than during the past few weeks.

Buffalo—Moderate increase in automotive demand for hot-rolled bars has been noted recently and specifications against reinforcing bar backlogs are somewhat larger.

Wire

Wire Prices, Page 79

Cleveland—Little variation in mill operations has been noted through most of March. However, sellers expect improvement in demand from agricultural centers and automobile parts suppliers during April will raise mill operations above 60 per cent. Weakness in prices for merchant wire items, noted earlier this year, has eased considerably the past few weeks.

Chicago—Wire demand has shown

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ENGLAND Burton, Griffiths & Co. Ltd.
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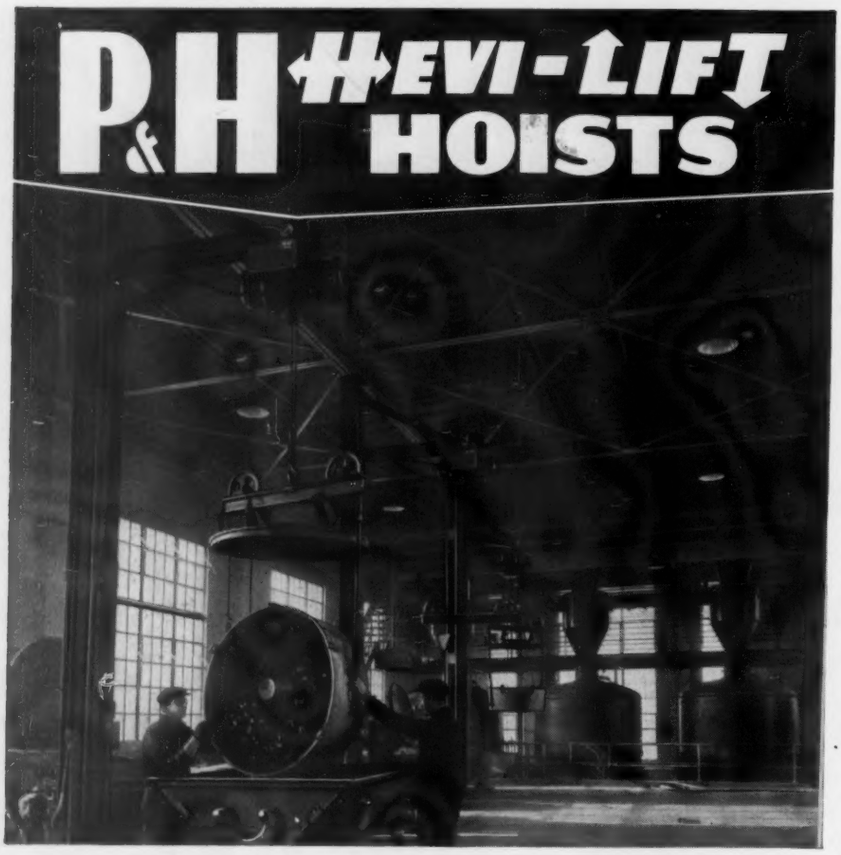
ERIE BUILDS Dependable HAMMERS

no recent improvement, although producing interests state that business averages well. Heavier automobile production is being awaited as a spur to increased wire demand. A strong miscellaneous demand for wire is being felt, but usual large sources are not buying so well. Nevertheless, tendencies of the market at present are considered normal for this time of year.

Boston — Expected improvement in wire business has been slow to develop, volume barely being maintained despite some releases from textile and automotive consumers. Merchant wire products are dull as secondary sellers covered heavily early in the year.

New York—Buying of wire has improved irregularly except in cable and electrical goods. Some improvement is traceable to automotive needs. Prices are steady except on building wire.

Birmingham, Ala. — Demand is steady for wire products, which are currently being produced at about 75 per cent of capacity.



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Rails, Cars

Track Material Prices, Page 79

Railroad buying has receded sharply from the rate of the past few weeks, though considerable business is pending. Maine Central is expected to distribute 300 gondolas shortly. Delaware & Hudson has placed six coaches with American Car & Foundry Co., New York. Pittsburgh & West Virginia has withdrawn application for funds to buy 700 cars. Illinois Central is reported to be inquiring for material for 1000 gondolas, indicating it may build instead of buying on its recent inquiry.

Wabash has placed 7500 tons of the 10,000 tons of rails authorized by federal court and is inquiring for four diesel switchers.

Orders for locomotives unfilled March 1 were 116, against 91 Feb. 1 and 159 March 1, 1938. Locomotives delivered in February totaled 17, in January 23 and in February last year 16. Two months' shipments this year were 40 against 51 last year. Freight cars on order March 1 totaled 6788, compared with 6637 Feb. 1, and 5568 March 1, 1938.

Car Orders Placed

Delaware & Hudson, six passenger coaches, to American Car & Foundry Co., New York.

Rail Orders Placed

Wabash, 7500 tons, 112-pound rails, to Inland Steel Co., Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.; part of 10,000 tons authorized by court.

Locomotives Pending

Wabash, four diesel switchers; authorized by federal court.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 79

Demand for bolts, nuts and rivets has failed to show expected improvement and is about on a par with last month. Railroad and automobile needs are steady and agricultural implement builders have not yet entered the busy season. Building demand is developing too late to have much effect this month. New York Central's distribution of track bolts a few days ago is the most important recent purchase. Shipyard releases are steady. One large producer of bolts and nuts has announced that effective immediately it will quote on a single discount basis, superseding the former plan of two or more discounts. This simplifies figuring prices. A leading rivetmaker has extended prices for second quarter.

Shapes

Structural Shape Prices, Page 78

Pittsburgh—Placements of shapes have been light recently although a substantial number of new projects are appearing. Most are public works although there continues to be a fair sprinkling of privately financed construction.

Cleveland—With approval of a bond issue and a federal aid grant, several school projects are expected to appear for bids soon, the largest being the Central high. Public work still dominates. The Carter road bridge project, Cleveland involves 1870 tons, for which bids are due April 6.

Chicago—Demand for structural steel is considerably improved this week. A considerable number of awards are less than 100 tons, but the total is expanding. In addition there are five new inquiries this week ranging from 280 to 1000 tons each, and more projects involving larger tonnage are seen in the near future.

Boston — Small bridge work, schools and miscellaneous public works make up the bulk of pending business. An elevated highway section, Providence, R. I., taking close to 1500 tons, is outstanding.

Philadelphia—Total shape awards are small, but volume is encouraging. Several large public jobs remain before the trade, including tunnels for the Pennsylvania turnpike commission and office building for the Pennsylvania liquor control board.

Buffalo — Architects and fabricators are unable to figure all the school jobs and other government financed projects scheduled for construction this spring. Only a few private undertakings are scattered through the list of pending and tentative projects. John B. Pyke, Rochester, N. Y., is low bidder on a school project, Newark, N. Y., requiring 400 tons.

St. Louis—While new projects being placed are still small in the aggregate and operating schedules at fabricating yards remain around 25 per cent of capacity, prospective business has broadened. The principal project pending is a viaduct in Kansas City, Mo., requiring 3000 tons of shapes. Plans will be completed and ready for bids in April. A postoffice garage in St. Louis, calls for 240 tons.

San Francisco—Structural shape demand continues quiet and awards totaled only 1106 tons. This brought the aggregate to date to 33,314 tons, compared with 19,002 tons in 1938. Moore Drydock Co. booked 307 tons for a crossing over University avenue, Berkeley, Calif. and unnamed interests secured 214 tons for an undercrossing on Chapman street, Los Angeles.

Shape Awards Compared

	Tons
Week ended March 25	**15,840**
Week ended March 18	**22,227**
Week ended March 11	**16,042**
This week, 1938	**13,052**
Weekly average, year 1938	**21,566**
Weekly average, 1939	**24,796**
Weekly average, February	**17,123**
Total to date, 1938	**176,184**
Total to date, 1939	**272,753**

Includes awards of 100 tons or more.

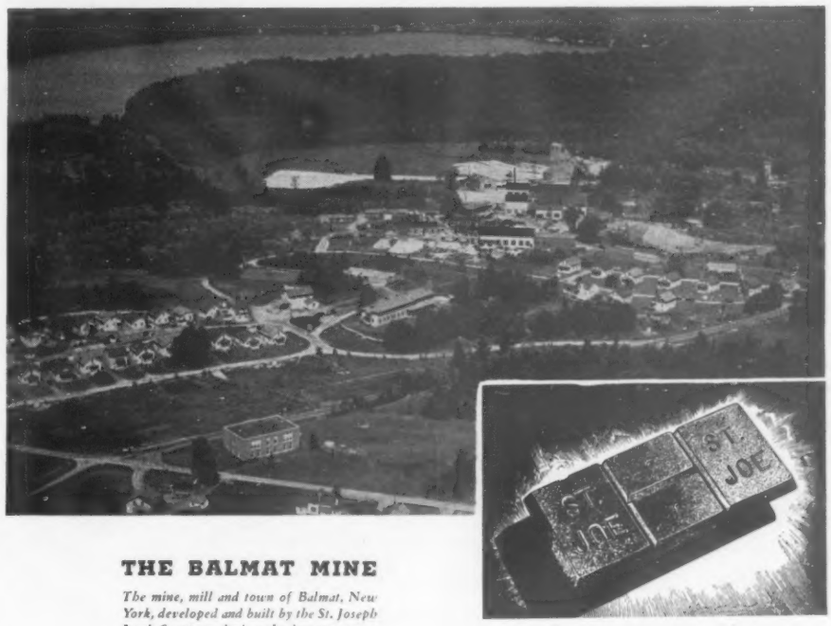
Shape Contracts Placed

7500 tons, Delaware aqueduct section, Ulster county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through S. R. Rosoff Co., New York.

1350 tons, including 650 tons H-piling and 700 tons of sheet piling and bracing, substructure, bridge, Jamestown,

FROM ORE TO METAL

The Story of St. Joe Electro-Thermic Zinc—Number 1 of a Series



THE BALMAT MINE

The mine, mill and town of Balmat, New York, developed and built by the St. Joseph Lead Company during the last ten years.

CLOSE TO THE BEAUTIFUL FOOTHILLS of the Adirondack Mountains, hidden for untold centuries under forest and lake, lay the great zinc deposit now known as the Balmat Mine.

Developed in 1927 and 1928 by the St. Joseph Lead Company, this great ore body which on the surface was a thinly mineralized non-commercial limestone, is currently shipping, with the old "Edwards mine" ten miles away, 60,000 tons of zinc concentrates, and 70,000 tons of iron pyrites per year.

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PLANT AND LABORATORY, JOSEPHTOWN, BEAVER COUNTY, PENNSYLVANIA

R. I., to Carnegie-Illinois Steel Corp., Pittsburgh; through Merritt-Chapman & Scott, New York.

700 tons, including 300 tons sheet piling, Lake Washington pontoon bridge, Seattle, to Columbia Steel Co., Seattle.

652 tons, high school, Rockford, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

610 tons, bridge No. 1805, Caddo parish, Louisiana, to Vincennes Steel Corp., Vincennes, Ind.

572 tons, highway bridge, Longview, Tex., to Virginia Bridge Co., Roanoke, Va.

495 tons, state bridge, route 6, sections 8A and B, Clifton, N. J., to American Bridge Co., Pittsburgh; through El-Dora Contracting Co., Newark, N. J.

425 tons, school, Cabell county, Salt Rock, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.

330 tons, high school, South Bend, Ind., to Mississippi Valley Structural Steel Co., Decatur, Ill.

310 tons, 9-story apartment, 187th street and Fort Washington avenue, New York, to Grand Iron Works, New York.

307 tons, crossing at University avenue, Berkeley, Calif., to Moore Drydock Co., Oakland, Calif.

265 tons, state highway plate girder bridge over Pennsylvania railroad, Princeton Junction, N. J., to American Bridge Co., Pittsburgh.

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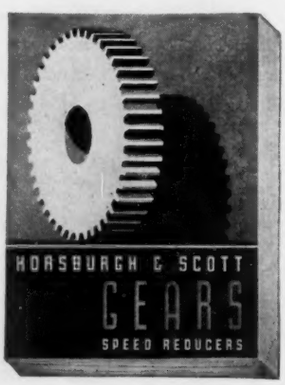


THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE., CLEVELAND, O., U. S. A.

250 tons, metal storage building, Aluminum Co. of America, Cleveland, to American Bridge Co., Pittsburgh.

220 tons, dam, Whitney Point, N. Y., to American Bridge Co., Pittsburgh.

214 tons, Santa Fe track crossing, Chapman street, Los Angeles, to unnamed interest.

210 tons, state undercrossing Spokane, Wash., to Bethlehem Steel Co., Seattle; C. A. Powers, Spokane, general contractor.

175 tons, school, Poughkeepsie, N. Y., to Ingalls Iron Works, Birmingham, Ala.

155 tons, municipal garages, Nashville, Tenn., to Nashville Bridge Co., Nashville.

150 tons, high school, Flemingsburg, Ky., to International Steel Co., Evansville, Ind.

150 tons, over-crossing, Oroville, Calif., to Judson-Pacific Co., San Francisco.

150 tons, state highway bridge, RC-2559, Chester-Vails Gate highway, No. 154, Orange county, New York, to American Bridge Co., Pittsburgh; through Lane Construction Co., Meriden, Conn.

145 tons, Roosevelt Junior high school, Mason City, Ia., to American Bridge Co., Pittsburgh.

140 tons, building additions, United Aircraft Corp., East Hartford, Conn., to Standard Structural Steel Co., Hartford.

135 tons, school, Rensselaer, N. Y., to Clausen Iron Co. Inc., Albany, N. Y.

130 tons, grade and high school, Nunda, N. Y., to Genesee Bridge Co., Rochester, N. Y.

100 tons, Central grade and high school, East Pembrooke, N. Y., to F. L. Heughes & Co. Inc., Rochester, N. Y.

Unstated tonnage, one-story office building for International Harvester Co., at its Indianapolis motor truck engine works, to J. L. Simmons Co., Chicago.

Shape Contracts Pending

3000 tons, Kansas City, Mo., Blue River viaduct; plans will be completed in April for bids.

2000 tons, office building, Pennsylvania Liquor Control board, Harrisburg, Pa.; bids April 5.

1870 tons, Carter road bridge, Cleveland; bids April 6.

1400 tons, grade separation, contract 39.5, New York city parkway authority, New York.

1250 tons, viaduct, East river drive, New York.

1200 tons, curbing, New York.

1200 tons, garage building, New York, for United States treasury department.

1000 tons, hall of music, Indiana university, Bloomington, Ind.; bids April 10.

1000 tons, contract 6, East river drive; bids March 29.

850 tons, overhead crossing, Chicago.

800 tons, Huntsville, Ill., building, General Illinois Public Service Co., Springfield, Ill.

800 tons, Central avenue pumping station, Chicago; bids March 31.

700 tons, field artillery armory, Chicago; bids March 29.

700 tons, water filtration plant for Owensboro, Ky.; also 500 tons of reinforcing bars; bids in.

700 tons, Sideling hill tunnel, Pennsylvania Turnpike commission, Harrisburg, Pa.; bids March 30.

700 tons, state highway bridge, Route 55, Blair county, Pennsylvania; bids in.

600 tons, city hall, Elizabeth, N. J.

600 tons, garage and storehouse, board of commissioners, Jersey City, N. J.

515 tons, trolley bridge crane, United

Illuminating Co., Bridgeport, Conn.

500 tons, extension to building No. 3, New York Shipbuilding Corp., Camden, N. J.

500 tons, two Illinois state highway bridges; bids March 24.

500 tons, ramp connection, Route 109 and 49, Brooklyn, N. Y.

425 tons, bridge over Powder river, Broadus, Mont., for state.

425 tons, bridge, cross county parkway, Yonkers, N. Y., for Westchester county, New York.

415 tons, supports for substations; bids in to Bonneville authority, Portland, March 24.

400 tons, Cowley, Kansas, highway bridge; List & Clark, Kansas City, Mo., low.

400 tons, high school, Newark, N. Y.; John B. Pyke, Rochester, N. Y., low.

400 tons, elementary school, Trenton, N. J.; N. A. K. Bugbee Co., Trenton, low.

400 tons, school building, Wappingers Falls, N. Y.

380 tons, Taylor street viaduct, Washington; bids April 11.

380 tons, addition to post office and court house, Los Angeles; Baruch Corp., 625 South Olive street, Los Angeles, low on general contract at $445,900.

375 tons, foundry building addition, Ford Motor Co., Dearborn, Mich.

375 tons, junior and senior high school, Newark, N. J.

350 tons, school, Cassadaga Valley, N. Y.; Hass Construction Co., Jamestown, N. Y., low.

310 tons, maintenance buildings, No. 10 and 11, city of Cleveland; Bethlehem Steel Co., Bethlehem, Pa., low.

300 tons, high school, Austin, Minn.

300 tons, school, Almond, N. Y., bids April 5.

300 tons, school, Andover, N. Y.; bids March 28.

300 tons, Laurel Hill tunnel, Turnpike commission; bids March 31.

280 tons, sixth section Chicago subway, general contract; bids April 6.

250 tons, bottling plant, Coca Cola Bottling Co., Philadelphia.

240 tons, St. Louis post office garage; J. S. Alberici, St. Louis, awarded general contract.

230 tons, vacuum still 2302, Atlantic Refining Co., Philadelphia.

230 tons, repairs to bridge, Wayne county, Michigan.

225 tons, bridge, Berkeley street, Boston, Mass.

200 tons, state bridge FAS-4-A, Hillside, Ariz.

200 tons, hospital, Rome, N. Y.; White Construction Co., New York City., low.

200 tons, Thomas Jefferson memorial, Washington; John McShain Inc., Philadelphia, low.

180 tons, underpass FAGM-608-F, Chippewa street, St. Louis.

175 tons, school, Genoa, N. Y.

125 tons, steel plate girder bridge over Santa Maria river, Yavapai county, Arizona; bids opened.

120 tons, screw machine building, Nineteen Hundred Corp., St. Joseph, Mich.

120 tons, coal bunker, Gair Carton Inc., Piermont, N. Y.

120 tons, beam bridge over Maine Central railroad, for state of Maine.

118 tons, bridges in Alaska for road commission; bids to J. R. Ummel, purchasing agent, Seattle, April 5, Spec. 04653.

115 tons, department store, Montgomery Ward & Co., Fulton, N. Y.

100 tons, postoffice, Town of Tonawanda, N. Y.; bids April 11.

Unstated, pier plates, trusses, etc., Coulee spillway; Hardie-Tynes Mfg. Co., Birmingham, Ala., and Valley Structural Steel Co., Melrose Park, Ill., low on two items.

Unstated, four gates, frames, hoists, etc., Fresno Dam, Milk River project, Mont.; Coalin Birmingham Mfg. Co., low.

Unstated, two 5-span state bridges; bids to highway commission, Helena, Mont., March 31.

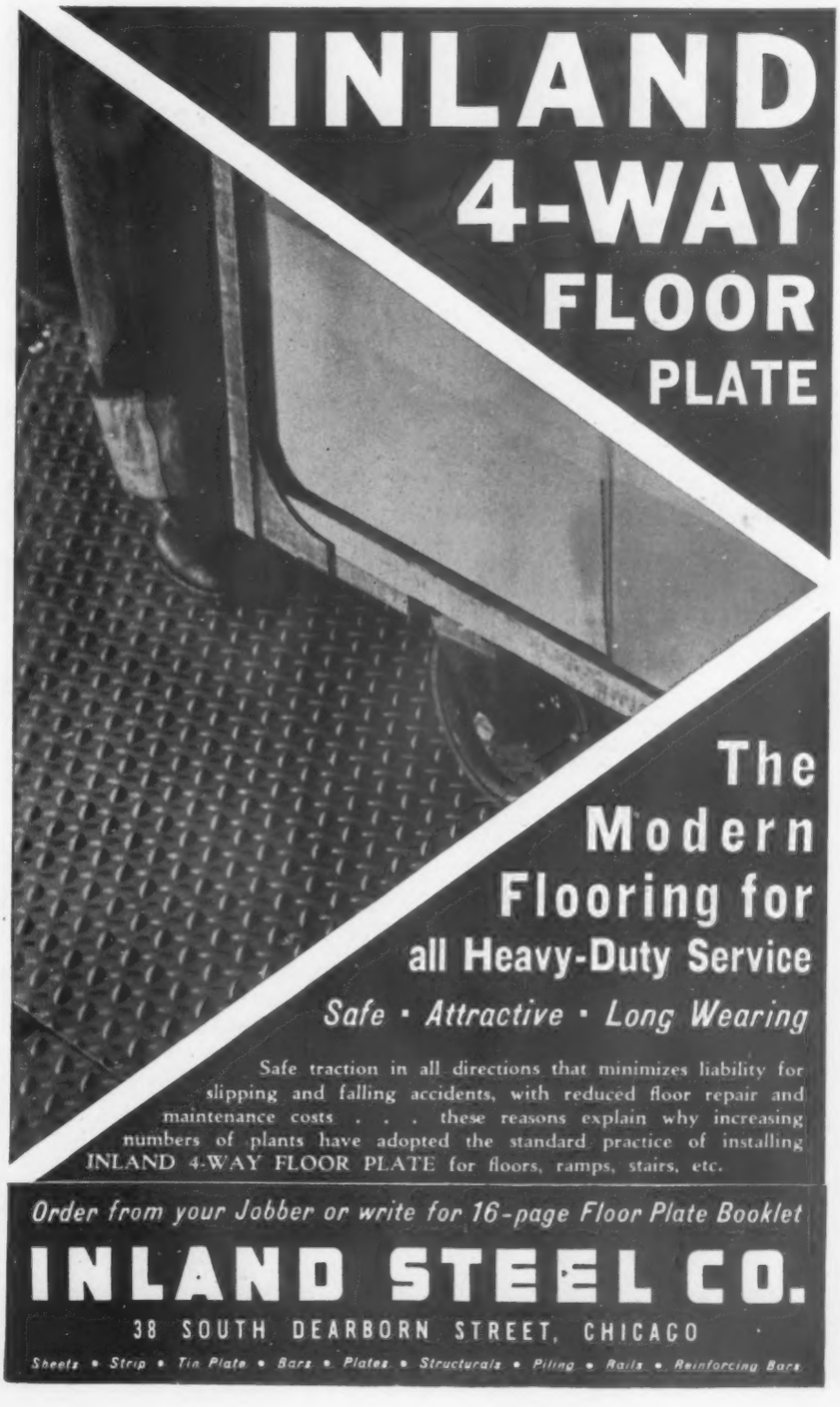
Unstated, 125 to 500-foot crossing towers; bids to Bonneville authority, Portland, March 25.

Reinforcing

Reinforcing Bar Prices, Page 79

New York—While awards are light more tonnage is coming out for estimates with better than 1000 tons required for highway work in New York city and 1550 tons for a bridge at Highbridge park, N. Y. Prices although still weak appear steadier.

Pittsburgh—Although new reinforcing bar projects are not coming out in volume nearly 50,000 tons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Behind the Scenes with STEEL

G. E. Shocked

■ A little girl in the Bronx, New York last week embarrassed the world's largest electrical company. She wants "a little sample of electricity". It was the first request of its kind within the memory of officials of the General Electric Co., which for some 60 years has figured it knew all the answers to "current" problems. Apparently the little dickens is studying about it in "Georgraphy" and just wants "some booklets and a little sample of electricity, if you can spare it". Latest word from Schenectady states the entire engineering department and the board of directors have decided to see that their little friend passes "Georgraphy" even if they have to shock the shoes off her school teacher, to get her through.

Rubber Czechs

■ Our telephone operator tossed off the best crack of the week on the European situation as she noticed us pouring over the latest news on Hitler's grab of Czecho-Slovakia. "Just let Hitler wait", she pipes, "until those Czechs bounce back on him." We have a hunch, too, that those 80 millions in gold won't be enough to make the Czechs good by a long way.

Swing Out, Boys

■ We didn't have a chance last week to tell you about the annual banquet of the American Society of Tool Engineers on Thursday evening of the show in Detroit. Talk about fun! Talk about swell guys! Jeepers Creepers it had everything. But what we got the biggest kick out of was the new society song, *On With the A.S.T.E.*, which the 500 exuberant diners were urged to carol as the evening mellowed. Words and music are by J. A. Siegel.

We're engineers who answer the call
To tool the jobs, both great and small,
Designing machinery and tools for the nation,
With simplified practice and standardization.
We have master mechanics and chief tool designers
And sales engineers with all their data in binders.
Our meetings instructive
Have proven productive,
So on with the A. S. T. E.

Plaster that onto the lilting tune it carries and you've really got something.

Name Does It

■ The Boom Boiler & Welding Co. here in Cleveland seems to have been well named. Despite the current business recession it has been found necessary to buy two new plants to meet a heavy increase in production.

Unseen Saw Salesman

■ Apparently the J. H. Miner Saw Manufacturing Co. down in Meriden, Miss. is a great believer in sales by mail. With a picture of Uncle Sam holding a circular saw prominently displayed on their envelopes they wax poetic with this ditty: *Our Only Salesman Calls Rain or Shine; Does Not Take Up Your Valuable Time.*

Dies But Not Dead

■ Congressman Dies, who has built up quite a reputation for uncovering Communists in the most unexpected places, has probably one of the most misleading headline names in the news. *The Worcester Gazette* sometime ago headed a story thus: *Dies In Fine Shape Following Operation.*

—SHRDLU

—The Market Week—

of announced business is still unplaced. A considerable portion is in small tonnages, but there are several jobs over the 100-ton mark. A few new projects are coming out, but there is a definite trend towards getting this standing business off the books as soon as possible. Strength of the market as opposed to weakness last fall and winter has been a deterring factor in these placements.

Cleveland—Private work is light while volume of public projects remains substantially unchanged. For a highway bridge in Franklin county, Ohio, Pollak Steel Co., Cincinnati, booked 600 tons.

Chicago—Concrete bar market was quiet last week, with total pending tonnage substantially unchanged, and closings being almost entirely of less than 100 tons each.

Approximately 550 tons of bars for a third senior high school at Rockford, Ill., is reported booked by Joseph T. Ryerson & Son Inc., Chicago. Remaining substantial tonnages are mostly in Chicago subway construction. Of the five sections already booked by general contractors, only the first three have bought bar tonnage, leaving close to 9000 tons still pending.

Philadelphia—Construction projects involving less than 100 tons individually are coming out in greater volume, but few of size are appearing. Prices continue weak, even on small lots.

St. Louis—Sheffield Steel Corp., Kansas City, Mo., has been awarded 220 tons for a school in St. Louis. The largest pending contract, post-office garage here, will require 700 tons. Numerous small government and state jobs are pending, but there is continued dearth of private work.

San Francisco—While demand for reinforcing bars has fallen off somewhat awards placed so far this year exceed by 100 per cent bookings for the corresponding period in 1938. Awards this week to-

Concrete Bars Compared

	Tons
Week ended March 25	**9,113**
Week ended March 18	**8,558**
Week ended March 11	**5,273**
This week, 1938	**1,413**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**11,915**
Weekly average, February	**8,268**
Total to date, 1938	**62,906**
Total to date, 1939	**131,065**

Includes awards of 100 tons or more.

taled 2255 tons, bringing the aggregate to 51,577 tons, compared with 22,720 tons a year ago. Gilmore Fabricators Inc., secured 602 tons for two steam plants for the Pacific Gas & Electric Co. at Avon and at Martinez, Calif. Reliance Steel Products Co. booked 456 tons for 34 naval amunition buildings at Hawthorne, Nev.

Seattle—Only sizable project up for figures is the Seattle federal courthouse, bids at Washington, April 7, estimated to require more than 1000 tons of reinforcing bars. Mill operations have increased slightly, due to recent awards. Contracts placed this week include 400 tons of I bars for the Lake Washington pontoon bridge to Columbia Steel Co., Seattle, and 435 tons for the Eugene, Oreg. water reservoir to unnamed Portland dealers.

Reinforcing Steel Awards

2600 tons, Grand Coulee dam, Washington, to Bethlehem Steel Co., Bethlehem, Pa., at $134,263.

602 tons, steam plants at Avon and Martinez, Calif., for Pacific Gas & Electric Co., to Gilmore Fabricators Inc., San Francisco.

600 tons, bridge, North Broadway, Columbus, O., to Pollak Steel Co., Cincinnati; Owens-Ames-Kimball, Detroit, contractors.

500 tons, cold storage building, Morrell Co., Ottumwa, Iowa, to Laclede Steel Co., St. Louis.

456 tons, 34 naval ammunition buildings, Hawthorne, Nev., to Reliance Steel Products Co., Los Angeles.

435 tons, water reservoir at Eugene, Oreg., to unstated interests; H. J. Adler, Yakima, Wash., general contractor.

400 tons I bars for Lake Washington pontoon bridge, Seattle, to Columbia Steel Co., Seattle.

400 tons, bridge over Piscataqua river, contract 3, Kittery, Me., to Bethlehem Steel Co., Bethlehem, Pa., through Bancroft & Martin.

300 tons, grade crossing, Great Kills, Staten Island, N. Y., to Truscon Steel Co., Youngstown, O.; through Poirier & McLane Corp., New York.

263 tons, bureau of reclamation, invitation A-38,297-A, Buena, Wash., to Bethlehem Steel Co., Seattle, Wash.

250 tons, grain elevator, Early & Daniels Co., Cincinnati, to Pollak Steel Co., Cincinnati; through Jones & Hettalsator, Kansas City, Mo., general contractor.

223 tons, Pennsylvania turnpike, sections 15 and 16, Fulton county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, Banneker school, St. Louis, to Sheffield Steel Corp., Kansas City, Mo.

155 tons, bureau of reclamation, invitation 32,093, Ignacio, Colo., to Colorado Fuel & Iron Co., Pueblo, Colo.

150 tons, dormitory, Ohio State university, Columbus, O., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

150 tons, grain elevator, Decatur, Ill., to Laclede Steel Co., St. Louis.

150 tons, railroad overcrossing Spokane county, Wash., to Bethlehem Steel Co., Seattle; Barnard-Curtis Co., Minneapolis, general contractor.

144 tons, bureau of reclamation, invitation A-33,835-A, Buena, Wash., to Columbia Steel Co., San Francisco.

142 tons, civic auditorium and fire station, Santa Cruz, Calif., to Herrick Iron Works, Oakland, Calif.

125 tons, Central school, East Bloomfield, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Reecon Inc., Buffalo, N. Y.

112 tons, bureau of roads, Willamette tunnel project, Oregon state, to unnamed interests; Kuckenberg Construction Co., Portland, general contractor.

110 tons, bureau of reclamation, invitation 32,092, Ignacio, Colo., to Republic Steel Corp., Youngstown, O.

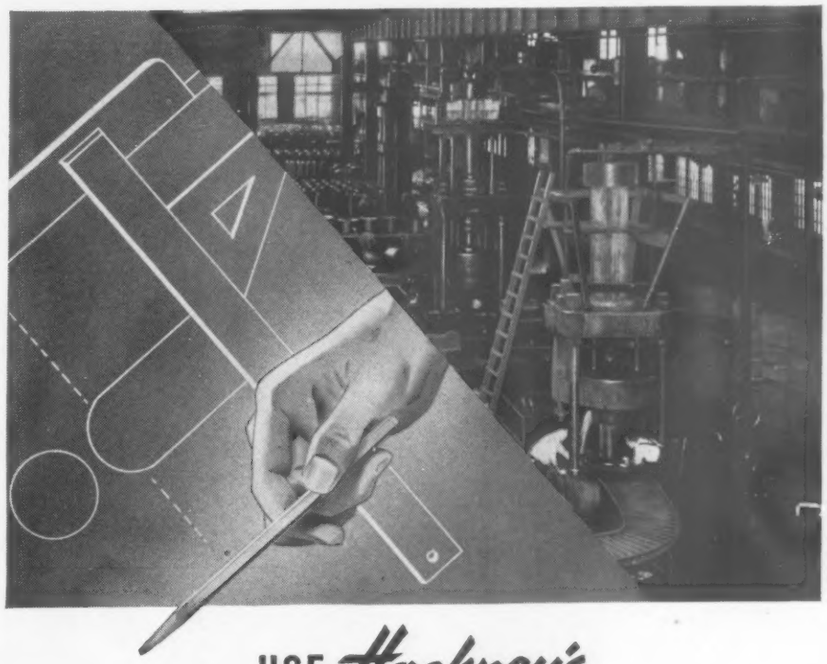
110 tons, detention home, Columbus, O., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

110 tons, state highway bridge, Gwynns Island, Va., project S-1197-B1, to Virginia Steel Co.; Bowers Construction Co., contractor.

106 tons, highway work, Washoe county, Nevada, to Bethlehem Steel Co., San Francisco.

100 tons, school, Lindenwald, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, museum, University of Minnesota, Minneapolis, to Truscon Steel Co.,



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DEEP DRAWN SHELLS AND SHAPES

Youngstown, O.
100 tons, school, Nunda, N. Y., to Genesee Bridge Co., Rochester, N. Y.

Reinforcing Steel Pending

4000 tons, contract 6, East river drive, New York; bids March 29.

2217 tons, bureau of reclamation, invitation A-38,311-A, Odair, Wash.; bids opened.

1440 tons, flood wall, invitation 516-39-240, Huntington, W. Va., army engineers; West Virginia Rail Co., low bidder.

1000 tons or more, federal courthouse, Seattle; bids to treasury department, Washington, April 7.

950 tons, science building, junior college, San Francisco, Barrett & Hilp, 918 Harrison street, San Francisco, low on general contract.

700 tons, St. Louis post office garage; J. S. Alberici, St. Louis, awarded general contract.

500 tons, addition to postoffice and court house, Los Angeles; Baruch Corp., 625 South Olive street, Los Angeles, low on general contract.

500 tons, substructure, Erie avenue and East Twenty-first street bridges, Lorain, O.; bids March 30.

500 tons, east side high school, Rockford, Ill.

458 tons, bars and mesh, bridge near Hough street for Los Angeles county, California, bids opened.

445 tons, north approach, piers, Raritan river bridge, Sayreville-Woodbridge, N. J.; J. F. Chapman Co., Hillside, N. J., low.

390 tons, reconstruction stilling basin, Calaveras dam, Sunol, Calif.; Eaton & Smith, 715 Ocean avenue, San Francisco, low on general contract.

315 tons, circumferential highway, New York, contract MC-39-7, Elmhurst Contracting Co., New York, low.

300 tons, Cuyler high and elementary school, Trenton, N. J.

250 tons, flood control project, Tell City, Ind.

250 tons, bureau of reclamation, invitation 46,033-A, Kremling, Colo.; bids opened.

250 tons, auditorium, Oberlin, O.; bids March 27.

200 tons, Franklin avenue viaduct, Cincinnati; bids in.

200 tons, school, Newark, N. Y.; John B. Pyke, Rochester, N. Y., low.

200 tons, bridge, Ludlow avenue, Cincinnati, O.

199 tons, two crossings near Pomona, Los Angeles county, California; bids March 30.

189 tons, treasury department, Los Angeles, invitation 52879; Bethlehem Steel Co., Los Angeles, low.

158 tons, auditorium, Marina junior high school, San Francisco; Monson Bros., 475 Sixth street, San Francisco, low on general contract.

145 tons, contract, SC-39-5, Circumferential highway, New York; National Excavation Co., New York, low.

140 tons, Lake street viaduct in connection with Golden Gate bridge, San Francisco; bids April 5.

140 tons, assembly hall for high school, Sacramento, Calif.; bids opened.

137 tons, two bridges over Coyote creek, Santa Clara county, California, for state bids, April 5.

127 tons, seven bridges for Sacramento county, California; bids opened.

103 tons, library and administration building, University of California, at Davis, Calif.; Carl N. Swenson, 335 Stockton avenue, San Jose, low on general contract.

100 tons, homeopathic hospital, Maple street, San Francisco; Barrett & Hilp, 918 Harrison street, San Francisco, low on general contract.

100 tons, sewage disposal plant, Phrata, Pa.; bids March 24.

Pig Iron

Pig Iron Prices, Page 80

Pittsburgh — Operations of most foundries are unchanged, with releases slow, representing immediate needs. Larger melters, including radiator and sanitary ware interests, are producing partly for stock in anticipation of spring demand. Business is expected to develop in sufficient volume to prevent sharp curtailment in production in the near future. Blast furnace operations are unchanged.

Cleveland—A good indication of the steady gain in foundry operations since the first of the month is increase of approximately 15 per cent in foundry coke shipments for the first three weeks of March. Sellers report releases are little more than holding even with February. Contracting for second quarter requirements, now that prices have been reaffirmed, has proved somewhat heavier than some sellers anticipated.

Chicago — Rate of shipments is substantially unchanged, about 10 per cent ahead of same period in February. A flurry of sales, following opening of second quarter books, has quieted, although a number of consumers still are covering. Coke shipments have slowed a bit but still are not below last month.

Boston—Buying continues light, with consumers releasing shipments about in line with the current melt which is spottily better.

Philadelphia—New business in pig iron is heavier with more orders in lots of 100 tons or over. Jobbing shops are busier, with some operating five days a week for the first time since 1937. Builders of heavy equipment, such as presses, are also contributing to expanding activity, though makers of lighter tools are still comparatively quiet. Cast pipe plants and makers of cast iron toys are seasonally busier.

Buffalo—Slight expansion of pig iron shipments is shown, compared with February. While sales have not increased materially inquiry is

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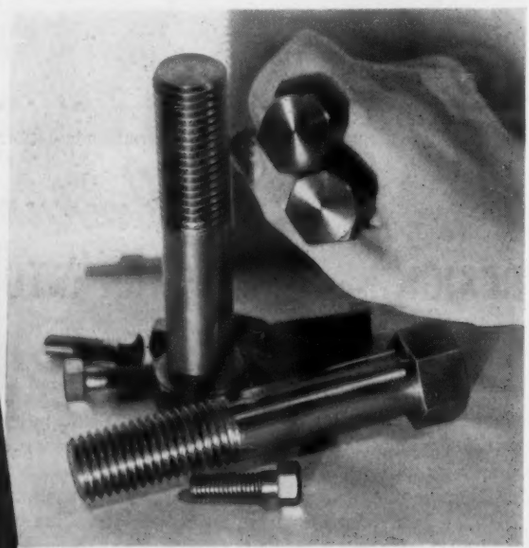

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more active and melters are operating at a fair rate. Buying is largely for immediate delivery.

Cincinnati—Melters appear in no hurry to take iron on contracts because remaining tonnage will be rewritten at the price effective at the time of booking. Some commitments at $1 lower than current quotations remain unfulfilled. Others are buying as needed or entering second quarter contracts for minimum requirements.

St. Louis—Pig iron buying has subsided somewhat during the past week or ten days, following a fair spurt of activity immediately following reaffirmation of prices for second quarter. Consumer stocks have been steadily diminishing since the first of the year. This applies to iron at mill and foundry as well as iron owed under contracts made last year. To continue present operations, replenishment by certain melters can not long be delayed.

Birmingham, Ala.—Except for the modernization program at Woodward Iron Co.'s No. 1 blast furnace, pig iron production continues to account for 15 active stacks with demand fairly consistent, although probably off somewhat from the peak early in the year.

Scrap

Scrap Prices, Page 82

Pittsburgh—Scrap prices are unchanged, with consumers inactive in buying. Scrap is available in relatively small quantities and brokers in covering old orders have difficulty in picking up No. 1 steel at much less than $16. Mills are not pressing for delivery against outstanding contracts.

Cleveland — First important purchases of iron and steel scrap made by two Cleveland steelmakers in weeks have just been closed at prices that have advanced melting steel, compressed sheets and blast furnace material 50 cents. The combined tonnage is said to have embraced 40,000 tons, some of it to arrive by water and some by rail. The order is understood to have been distributed among several dealers.

Chicago—Heavy melting steel is slightly easier, but trading continues at $14 to $14.50 for No. 1 grade. Dealers lately have sold at $14 and $14.25, whereas previously sales as high as $14.50 were heard. Reduced shipments to a leading consumer and availability of ample supplies contribute to the easier tone.

Boston—Prices generally are unchanged, with export business predominating. Domestic demand continues light, and iron car wheels and cast borings for chemical use are slightly easier.

New York—Eastern mills are taking slighter larger lots of scrap, but most activity continues in coverage of old export orders. The delegation here for the European scrap cartel is visiting eastern scrap centers but has not placed any new business. Brokers are not optimistic regarding a large purchase immediately as the visitors are reluctant to pay prices asked. Quotations generally are unchanged.

Philadelphia—Scrap shows a definitely stronger tendency with No. 1 heavy melting steel now quotable at $15.50 to $16 and No. 2 at $13.50 to $14 on a sale to a district mill at $16 and $14. Other steelmaking grades, including stove plate and compressed sheets, are participating in the stronger market. There has been no change in heavy cast but resumption of shipments to a large district mill is expected to strengthen this grade.

Export movement continues active with broker paying up to

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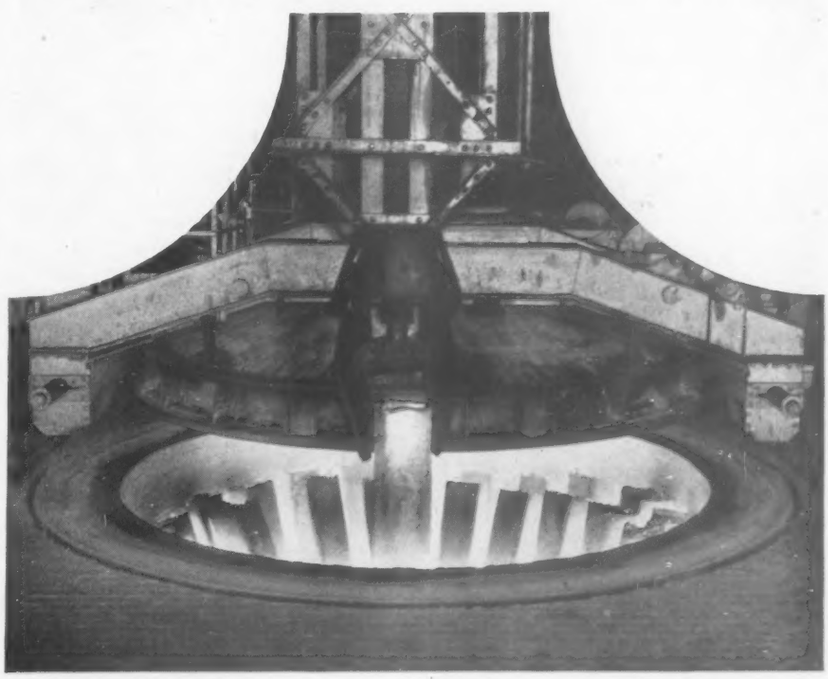

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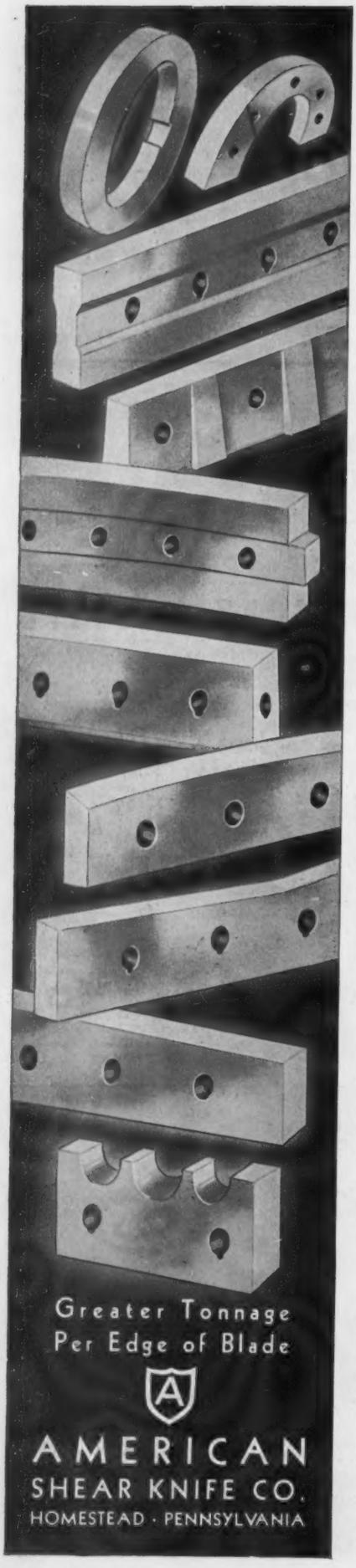

$15.50 for No. 1 and $13.75 for No. 2 when required to fill out cargoes.

Buffalo—Scrap continues slow despite heavier consumption by steelworks. However, mills still have sufficient supplies to make heavier receipts unnecessary, and one interest has held up all shipments. Cast scrap has a better tone.

Detroit—Lake shipments of scrap have started and sentiment has improved, resulting in an advance in prices on several grades. No. 1 busheling, heavy melting grades, heavy breakable cast, sheet clippings and turnings have advanced 25 to 50 cents. Buying for delivery to Cleveland mills has improved and the first cargo left here March 12.

Cincinnati—Scrap prices tend to be soft and melters show little interest at present levels. Shipments on contracts are steady. Recent railroad lists moved at about the same prices as in February. Most demand is for heavier grades and lighter scrap is not in demand.

St. Louis—Scrap holds steady in spite of lack of buying. Sellers and consumers are unable to agree on prices, resulting in stalemate. Smaller dealers refuse to sell at present prices and brokers are unable to obtain tonnages for contracts. Some consumer stocks are depleted with further buying necessary soon. Melters are taking in shipments steadily. Railroad offerings are light and country shipments moderate.

Birmingham, Ala.—Scrap remains inactive except for some scattered movement of No. 1 melting and cast. Some tonnage of cast is going into production of cast iron pipe and to stove foundries.

Seattle — Export scrap movement is quiet, foreign buyers preferring to place orders on the Atlantic and Gulf to avoid picketing and delays at Pacific Coast points. Local mills are paying $12 for No. 1 melting and $11 for No. 2. Despite conditions, export prices are firm at about $2 higher.

Warehouse

Warehouse Prices, Page 81

Pittsburgh—Warehouse sales have been slightly better in March than February, although not up to expectations. Merchant wire and pipe products are moving somewhat better, although demand from smaller manufacturers is light.

The 15-cent extra for certain types of hot-rolled bars and small shapes has been eliminated, while junior beams and stair stringer channels have been reduced 25 cents. New quantity differentials have been applied on cold-finished bars, galvanized sheets and stainless sheets.

Cleveland—Individual orders for warehouse material have increased in number but are small and the expected seasonal increase has not appeared. Cold-finished bars have been marked down from 4.05c to 3.80c and new quantity extras have been put in effect.

Chicago—Steel warehouse interests characterize sales as satisfactory with all indications that business this month will exceed that of February. A 5 per cent increase is estimated by a leading jobber interest.

Philadelphia—Warehouse sales of some large interests in March are the best since 1937, reflecting both seasonal and industrial improvement in activity. Some smaller interests are still receiving poor volume.

Buffalo—Demand has tapered following a slight improvement early in the month. Better buying is expected with the approach of spring.

Detroit—Volume of warehouse trade is slow and not much changed from the past two months. Tool and die work generally is approaching a peak, which is a favorable factor for sales out of warehouse, but this has not been reflected in sales.

Cold-finished bar base has been changed to 3.85c on sales out of warehouse and quantity extras revised in line with recent mill changes.

Cincinnati — Steel jobbers are pleased with the seasonal gain in tonnage from industrial sources. Inquiries for building materials are fairly active, but tonnages are small. Reduction of $5 a ton on cold-finished bars is effective at 4.05c.

St. Louis — Warehouses report slackening during the past week or ten days, though volume still is ahead of a year ago. Customers are buying from hand to mouth and practically all orders bear immediate shipping instructions.

Tin Plate

Tin Plate Prices, Page 78

Tin plate production is up about 5 points to 60 per cent. Buying is heavier than a year ago but has been somewhat below expectations. While shipments to packers are relatively light, mill stocks are not regarded as overly large. Some producers look for heavier business to appear shortly.

A contract for 5,000,000 boxes of tin plate for delivery over the next five years to American Can Co. of Canada has been booked by Richard Thomas & Co. of England, according to *Industrial Britain*. The contract is said to have been taken in

the face of keen competition from American firms.

"Although the Welsh tin plate industry has contrived for several years to secure extensive annual orders from Canadian canning interests, some apprehension was evident recently that these contracts might be lost owing to increasing inability to compete against cheaper world production," the publication states. The vast new plant of Richard Thomas & Co., built at Ebbw Vale, was designed mainly to meet modern strip mill competition.

Steel in Europe

Foreign Steel Prices, Page 81

London—(*By Cable*)—Market for foundry pig iron in Great Britain is dull but basic iron is active, owing to increase in steel output. Scrap supply is becoming short and domestic requirements are increasing. International complications tend to restrict exports and stimulate domestic demand. Tin plate is moving well in both domestic and export channels.

The Continent reports markets uncertain and spotty but semifinished steel is in demand. Germany's occupation of Czechoslovakia gives her control of 1,600,000 tons additional of steel capacity and 1,200,000 tons of pig iron.

Ferroalloys

Ferroalloy Prices, Page 80

New York—Germany's absorption of Czechoslovakia is expected to result in a firmer market for imported ferromanganese and possibly somewhat higher import prices. For several months Czech offerings have had a disturbing effect, about $75 being the price, about $5 under the domestic market of $80.

Further shipments from that source are practically precluded by increase in import duty from $17.92 to $33.60 per ton, due to withdrawal of the most favored nation treatment, which does not apply to Germany.

Some doubt exists as to whether material en route to this country will be subjected to the higher duty on arrival. However, in some previous cases of similar nature a reasonable time was allowed for such shipments to arrive, before imposing the higher figure.

Belgian Steel Imported

Philadelphia—Steel imports here during the week ended March 18 comprised 76 tons of structural shapes, 43 tons of steel bands, 22 tons of steel bars and five tons of steel hoops, all from Belgium. A shipment of 100 tons of ferromanganese came in from Poland.

Coke Oven By-Products

Coke By-Product Prices, Page 79

New York—Demand for coke oven by-products is active and increasing for several materials, with prices unchanged and firm. Sulphate of ammonia shipments against contracts to the fertilizer trade are heavier, also spot buying. Household requirements for naphthalene are larger through jobbers, with chemical demand fair. The plastic industry is taking a heavier volume of phenol and drug trade demand is steady. Lacquer makers are releasing substantial shipments of toluol and xylol and the chemical trade is also taking better volume of distillates, of which there are no accumulations of stock, current production moving out in good volume.

Iron Ore

Iron Ore Prices, Page 82

New York—While the European political situation contains potentialities for strengthening foreign ore prices, especially if Mussolini's scheduled pronouncement March 26, should lead to events which would tie up the Mediterranean, weakness still dominates foreign ore offerings. Buyers and sellers are marking time for the moment, with no disposition on the part of sellers to mark up quotations.

Consequently, recent offerings ap-

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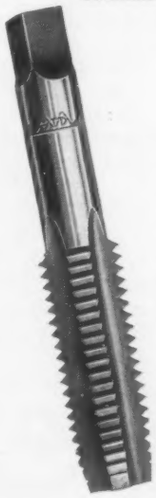

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This is an actual example of the way an experienced *"Greenfield"* sales engineer helped a New Jersey manufacturer to greater production and lower costs. *"Greenfield"* men know taps and tapping. Let them help you.

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A friendly welcome.

Food that is famous.

Instant, willing service.

Rooms with every detail planned for restful comfort.

Convenience that saves time and taxi fare. Hotel Cleveland adjoins the Union Terminal and Terminal group, and is at the very heart of Cleveland, Ohio.

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pear to represent the nominal market. Manganese ore, 50 per cent, is holding nominally around 26 to 27 cents, without duty, with 44 to 46 per cent material at around 24 cents.

Foreign low phosphorus ores are steady at 12 cents, alongside docks, Atlantic ports, and basic and foundry ores at 9 to 9½ cents. Manganiferous is unchanged at 12 cents, one of the few items to have held steady in recent weeks.

Contributing to general weakness in foreign iron and manganese ores has been lack of interest of domestic consumers. Most of them are still well stocked considering the rather drab outlook for this year. There has been some fair buying in chrome since the first of the year, but nothing compared with normal. Prices on chrome have held quite firmly, although with manganiferous ore. Prices on tungsten ore are slightly higher at $20 per short ton unit, duty paid, but there has been little or no buying of tungsten ore here.

Cleveland—Consumption of Lake Superior iron ore during February was 2,852,540 gross tons, compared with 2,926,706 tons in January, but more than a million tons greater than in February, 1938.

Stocks at lower lake ports and furnaces March 1 were approximately 9,700,000 tons less than on the same date last year. Lake Superior Iron Ore association's report follows:

	Furnaces	Lake Erie docks	Total
Mar. 1, 1939.	23,912,344	4,927,709	28,840,053
Month ago...	26,646,130	5,042,775	31,688,905
Year ago....	31,383,307	5,775,094	37,158,401

Activities of Steel Users, Makers

(*Concluded from Page* 32)

Zabriskie street, Hackensack, N. J. The company has leased a combined office and industrial building and is installing a physical and chemical laboratory for the study and development of processes and apparatus for handling industrial and municipal wastes. E. B. Mallory, director of research, will be in charge of the laboratories.

♦

International Nickel Co., New York, has received a $397,556 contract from the navy for nickel-copper alloy forgings.

♦

Granite City Steel Co., Granite City, Ill., has established a new sales office in Indianapolis, at 3957 Ruckle street, with J. E. Sweeney in charge. The company also recently opened a new sales office in New York under direction of Charles R. Wallander Jr., as reported in STEEL, March 20, page 30.

♦

Horace T. Potts Co., Philadelphia, distributor of iron and steel products, is now also handling a line of bronze products manufactured by Bunting Brass & Bronze Co., Toledo, O.

♦

Ellwood Stone Co., Ellwood City, Pa., recently acquired properties of the National Stone Co., New Castle, Pa., and is now marketing National fire stone for cupola, ladle and converter linings.

♦

Alan Wood Steel Co. has purchased the cut nail division of Reading Iron Co., Reading, Pa., from the company's receiver. Operations will be continued at Reading for some time but it is planned eventually to move the division's equipment to Conshohocken.

♦

Reliance Steel Products Co., 2068 East Thirty-seventh street, Los Angeles, has been organized as a reinforced steel fabricating firm to handle in southern California, steel furnished by the Pacific States Steel Co., Niles, Calif., Chad F. Calhoun, is president; Thomas J. Neilan, vice president, and Robert A. Weir, secretary.

♦

A new plant has been opened for the manufacture of sodium tetraphosphate, by the Rumford Chemical Works, Rumford, R. I. Manufacture is a process of evaporating to dryness a solution of orthophosphates and heating the resulting mixture to quiet fusion at a bright red heat. The fused material, sodium tetraphosphate, is slowly cooled in a continuous stainless steel cooler. Stainless steel also is used extensively in other parts of the plant.

♦

American Screw Co., Providence, R. I., has licensed the following to make Phillips recessed head screws: Chandler Products Co., Euclid, O.; Scovill Mfg. Co., Waterbury, Conn.; Pheoll Mfg. Co., Chicago; Lamson & Sessions Co., Cleveland. Previously licensed were Continental Screw Co., New Bedford, Mass.; Corbin Screw Corp., New Britain, Conn.; National Screw & Mfg. Co., Cleveland; Parker-Kalon Corp., New York; Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

♦

Noble Machine Co., Fort Wayne, Ind., has sold its metalworking department to its former vice president in charge of metalworking machinery, Walter H. Meyer. Mr. Meyer is no longer associated with the Noble company, except that he

is maintaining his office in the latter's building, operating the Walter H. Meyer Machinery Co. The Noble company is confining its efforts solely to woodworking machinery.

Nonferrous Metals

New York—Uncertainties arising from European political developments coupled with the depressing effect of a slump in Wall street security prices slowed up buying in nonferrous metals last week. It is generally believed that the situation abroad will remain unsettled for some time and will tend to hold recovery in general business at a slow pace. Metal consumers likely will hesitate, therefore, in buying more than required over the immediate future.

Copper—Export copper held unusually steady during the past week at around 10.30c, c.i.f. European ports. Sales in the domestic market spurted on Tuesday to 2421 tons, bringing the rate to the highest level since last October. Brass mill operations are holding at around 60 per cent. Electrolytic held firm here at 11.25c, Connecticut.

Lead—Due to the well-covered position of consumers, sales remained light with prices steady on the basis of 4.70c, East St. Louis. Improved business is expected to develop late this week when May books are opened.

Zinc—On a moderate turnover prices held steady on the basis of 4.50c, East St. Louis. Shipments held up well in line with the 62 per cent galvanized sheet output rate.

Tin—Prices moved upward with London standards reaching a new high since mid-January. The International Tin committee has made arrangements for liquidation of existing over-exports. This move was construed as "bullish" and may be accomplished by under-exporting during the next three to six months. The second quarter quota was fixed at 40 per cent of standard tonnages compared with the first quarter quota of 35 per cent for the free market and 10 per cent for the buffer pool which now totals 15,000 tons. Straits spot closed at 46.60c.

Antimony—Prices held steady on only routine business at 11.25c, New York, for American spot in cases and nominally 14.00c, duty paid New York, for Chinese spot.

Equipment

Chicago—Sales of machinery and heavy equipment are reported un-

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Mar.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
18	11.25	11.37½	10.32½	45.90	45.90	4.85	4.70	4.50	20.00	11.25	35.00
20	11.25	11.37½	10.32½	46.05	46.10	4.85	4.70	4.50	20.00	11.25	35.00
21	11.25	11.37½	10.32½	46.10	46.10	4.85	4.70	4.50	20.00	11.25	35.00
22	11.25	11.37½	10.25	45.95	45.95	4.85	4.70	4.50	20.00	11.25	35.00
23	11.25	11.37½	10.35	46.25	46.25	4.85	4.70	4.50	20.00	11.25	35.00
24	11.25	11.37½	10.40	46.60	46.60	4.85	4.70	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.37½-6.62½
Cleveland 7.25-7.50
Chicago 6.62½-6.87½
St. Louis 6.25-6.50

Heavy Copper and Wire

New York, No. 1 ..... 8.37½-8.50
Cleveland, No. 1 ..... 8.25-8.50
Chicago, No. 1 ..... 8.25-8.50
St. Louis 8.25-8.50

Composition Brass Borings

New York 5.62½-5.87½

Light Copper

New York 6.87½-7.12½
Cleveland 6.50-6.75
Chicago 6.62½-6.87½
St. Louis 6.50-6.75

Light Brass

Cleveland 4.25-4.50
Chicago 4.12½-4.37½
St. Louis 3.75-4.00

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.60-3.85
St. Louis 3.25-3.50

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.75-15.00
Mixed cast, St. Louis 7.75-8.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 11.00
Standard No. 12 aluminum 12.50-13.00

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changed, while smaller tools are quieter. A satisfactory amount of work is pending, with consumers showing considerable leisure in closings. Volume of inquiries is unchanged, but still characterized as good. A little more railroad business is being felt by some selling interests.

Seattle — Bonneville authority, Portland, Oreg., has called bids March 30 for furnishing condenser for the Raymond substation; April 20 for two oil transformer pumps. Same office has purchased an additional seven miles of conductor cable from Aluminum Co. of America, at $41,335 and American Transformer Co., is low at $44,031 for furnishing transformers. University Plumbing & Heating Co., Seattle, has the contract for the pumping plant at Puget Sound navy yard involving heavy pumping equipment. Allis-Chalmers Mfg. Co. is low to reclamation bureau at $1,769,400 for furnishing four electric turbines for the plant at Redding, Calif., also low at $97,000 for four oil pressure governors. Vancouver, Wash., has purchased chlorinator and water system equipment. King county, Washington, opens bids March 27 for a one-yard power shovel.

Construction and Enterprise

Ohio

ASHLAND, O.—City, W. A. Mason, mayor, will probably take bids April 15 on contract 2 in construction of sewage disposal plant costing $157,000, part of $300,000 project. Includes primary settling tanks, motor-driven rotary distributors, secondary tanks, chemical treating equipment etc. Consulting engineer, E. D. Barstow, Akron, O. (Noted March 13.)

CINCINNATI—Standard Oil Co. of Ohio has plans and will soon take bids for construction of a gasoline bulk plant and office building at cost of $375,000.

LEBANON, O.—Village, J. A. Kilpatrick, president, board of public affairs, has completed plans for constructing a chemical-type sewage treatment plant costing approximately $20,000. Alfred LeFeber, Cincinnati, consulting engineer.

NORWOOD, O.—City, Edgar H. Kelley, service director, will soon take bids on construction of a proposed pump house, water mains, wells, etc. Bond issue of $25,000 approved. Charles Harmon, city engineer.

SALINEVILLE, O. — Village, C. R. Randolph, mayor, may call special election on proposal to issue bonds to finance construction of projected waterworks costing $60,000. Includes reservoir and chemical treatment equipment. Consulting engineer, R. H. Hunter, Wooster, O.

STEUBENVILLE, O. — City, Eugene Boyd, service director, will probably take bids soon on waterworks changes and improvements costing total of $17,000 and involving purchase of some new equipment.

ZANESVILLE, O.—Zanesville Concrete Pipe Co. has plans underway, to mature in spring, for constructing a plant to manufacture concrete pipe at cost of about $100,000.

Massachusetts

HOUSATONIC, MASS.—Rising Paper Co. will build a two-story, 35 x 200-foot addition to its mill. Cost of project estimated at about $60,000.

New York

NEW YORK—Pavonia Building Corp. is altering at approximate cost of $40,000 its seven-story manufacturing plant and power house. W. Miltenberger, 551 Fifth avenue, New York, architect and engineer in work.

PERU, N. Y.—City water and sewer district No. 1 is taking bids on construction of a sewage treatment plant estimated to cost about $85,000. PWA has allotted funds in project. LeRoy G. Brown, Plattsburgh, N. Y., consultant.

SYRACUSE, N. Y.—Central New York Power Corp. has plans in progress to expend $500,000 for utility service improvements. Project is to mature soon.

New Jersey

HOBOKEN, N. J.—General Foods Corp. has awarded contract at $250,000 to H. K. Ferguson, 25 West Forty-third street, New York, for constructing a four-story, 100,000-square foot food plant. (Noted Feb. 13.)

Pennsylvania

WARREN, PA.—Warren County Electric Co-operative Inc., care of A. D. Wade, plans to spend more than $100,000 in construction of at least 100 miles of rural electric light and power lines.

Michigan

EAST LANSING, MICH.—City, Harry Lott, clerk, is receiving bids due April 3 on construction of a water softening plant in connection with a $65,454 project. City engineer, Fred Dodge.

Illinois

CHICAGO—Mineral Products Co. has been organized to deal in industrial and foundry materials and equipment. Correspondent, Cummings & Wyman, LaSalle street building, Chicago.

Florida

BUSHNELL, FLA.—Sumter Electric Co-operative Association Inc. has an REA allotment of $138,000 for constructing 173 miles of rural electric transmission lines through five counties.

JACKSONVILLE, FLA.—City commission, Guy Simmons, chairman, receives bids April 3 for making changes and additions in its electric transmission and distribution system. Scofield Engineering Co., Commercial Trust building, Philadelphia, consultant.

LAKELAND, FLA.—City, Charles Larsen, representative, receives bids March 28 for constructing an extension to its overhead electric distribution system, involving electric lines, steel towers, transformers, voltage regulators and other equipment.

Georgia

ATHENS, GA. — Athens Mfg. Co. has begun construction of a 100 x 500-foot, one-story addition to its manufacturing plant here. Cost approximates $100,000.

ROME, GA.—Tubize Chatillon Corp. has awarded contracts for constructing a one-story, 147 x 174-foot addition to its plant here to Batson-Cook Co., West Point, Ga. Roberts & Co., Atlanta, Ga., consulting engineers.

Mississippi

KOSCIUSKO, MISS. — City receives bids March 28 for making repairs to its

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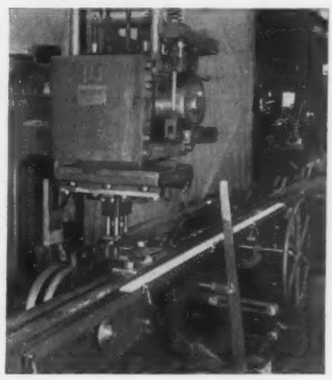

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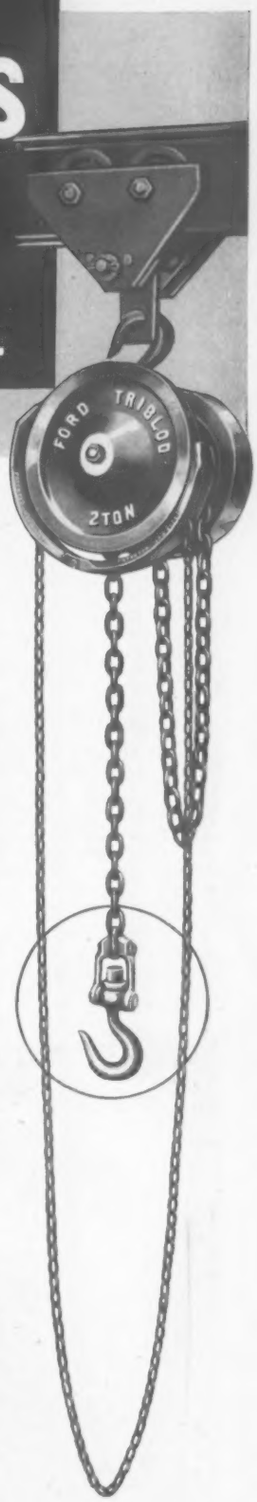

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North Carolina

CHARLOTTE, N. C.—Shell Union Oil Corp., H. H. Bird, district manager, plans to construct an addition to its bulk plant and a 30,000-gallon storage tank at cost of $62,500.

South Carolina

AIKEN, S. C.—Aiken County Rural Electrification association has received an REA allotment of $140,000, and will construct 174 miles of rural electric transmission lines through three counties.

Tennessee

BRISTOL, TENN.—S. E. Massengill Co. has plans in progress for construction of a new factory, five stories, estimated to cost about $100,000.

JACKSON, TENN.—City, board of commissioners, receives bids March 30 on contract No. 1, sub-project C, in the remodeling of its electric service building. Estimated cost, $20,000. Consulting engineers, Freeland, Roberts & Co., Nashville, Tenn.

Louisiana

MINDEN, LA.—City, David Thomas, mayor, has plans for installing a new electric generating unit in the municipal electric light and power plant.

SHREVEPORT, LA.—J. S. Beard Corp. has been organized with 50,000 shares no par value capital stock to deal in steel and iron. Correspondent, Richard W. Blalock, Marshall, Tex.

Virginia

CHASE CITY, VA.—Macklenburg Electric co-operative, Herbert Baer, engineer, and J. E. Smith, superintendent, has received an additional REA allotment of $120,000 in the projected construction of 118 miles rural electric power lines in four counties.

Missouri

ROGERSVILLE, MO. — City, Lewis Kraft, mayor, has completed plans and will file application with WPA for aid in the construction of a new waterworks system costing $38,000. Richard Grobeble, Springfield, Mo., consulting engineer.

Oklahoma

LAWTON, OKLA. — City has received PWA approval of assistance in project to improve its water supply facilities at approximate cost of $359,254.

Wisconsin

HARTFORD, WIS. — International Stamping Co., maker of steel stampings, proposes to build a 25 x 85-foot addition to its factory building.

MILWAUKEE — Ehne & Sons has awarded contract to Pelton Steel Co., 148 Dewey place, Milwaukee, for construction of an addition to its pattern shop at cost of about $25,000.

STOUGHTON, WIS. — Nelson Muffler Corp. has been incorporated by Charles E. Nelson and associates to manufacture mufflers for gasoline, oil and diesel engines.

Minnesota

DULUTH—Standard Oil Co., J. W. Honomichi, division manager, proposes to construct a four-story storage tank building at cost of about $100,000.

HIBBING, MINN.—City, V. L. Cole, clerk, has authorized completion of plans and will soon be ready for bids on installing a new 5000-kilowatt turbine in the municipal power plant. Burlingame, Hitchcock & Estabrook, Minneapolis, consultants. (Noted Feb. 16.)

JACKSON, MINN.—City, A. E. Wallace, clerk, is completing final plans for alterations to the municipal power plant and installation of new equipment. Burlingame, Hitchcock & Estabrook, Minneapolis, consulting engineers.

MORRIS, MINN.—Stevens-Big Stone Co-operative Power association, Victor Hanson, president, will be ready for bids about April 15 on constructing 200 miles of rural power transmitting lines in two counties. H. S. Bliss, care of owner, project engineer.

Texas

ALAMO, TEX.—City has plans underway for building a sanitary sewage system, collecting lines and sewage disposal plant at cost of $90,000. A. Tamm, Harlingen, Tex., consulting engineer.

BANDERA, TEX. — Bandera Electric Co-operative Inc. has REA funds in projected construction of 202 miles rural electric transmission lines in two counties at cost of $154,000.

HONDO, TEX.—Medina Electric Co-operative Inc. has received an REA loan in constructing 124 miles of rural electric power lines serving 319 consumers at cost of $101,000.

HOUSTON, TEX.—Big Three Welding Equipment Co. Inc., M & M building, has awarded contract to Ladewig Bros., Corpus Christi, Tex., for construction of a plant here. (Noted Jan. 16.)

VICTORIA, TEX. — Victoria County Electric Co-operative Inc. has been allotted an REA loan for construction of rural power lines costing $125,000 and serving 300 consumers.

Kansas

HORTON, KANS. — Brown-Atchison Electric co-operative, E. E. Dorssom, project manager, is preparing plans for constructing additional rural transmission lines at cost of approximately $150,000 in three counties. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant.

McPHERSON, KANS. — City, Ellen Lundstrom, clerk, will get plans underway at once for improvement of its power plant at cost of $25,000. Project includes new cooling tower and boiler feed pump. Burns & McDonnell Engineering Co., Kansas City, Mo., consulting engineer.

MELVERN, KANS.—City, E. B. Morgan, mayor, has WPA funds and will build a complete waterworks plant costing $48,000. Will vote April 3 on $23,000 bond issue to assist in financing project. Paulette & Wilson, Salina, Kans., consulting engineers.

SOLOMON, KANS.—D, S & O Rural Electric co-operative, Timothy Kelly, president, has awarded a contract to Dwight Chapin Jr., Hastings, Nebr., at $270,869, for constructing about 350 miles of rural electric lines in seven counties. R. H. Reed, Abilene, Kans., consultant.

Nebraska

WAYNE, NEBR.—Wayne County Rural Public Power district, Henry Moeding, project superintendent, is accepting bids until 7:30 p.m., April 13, on furnishing meters and other electrical equipment in the construction of a rural electric distribution system in two counties. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant.

Iowa

MONTEZUMA, IOWA—City council may hold special election April 7 on proposed $136,000 bond issue to finance construction of a municipal power plant.

RENWICK, IOWA—City, D. Elmer, mayor, is taking bids until 10 a.m., April 10, on improvements to its power plant, including 260-horsepower diesel engine, auxiliary equipment, exciter and switchboard extensions. Young & Stanley, Muscatine, Iowa, consulting engineers.

ST. ANTHONY, IOWA—City, Oscar Wallwork, mayor, will vote April 6 on proposed franchise for Iowa Electric Light & Power Co. under which it will build a power generating plant and facilities for current distribution.

SUMNER, IOWA—City, H. W. Bathke, clerk, is receiving bids until 1 p.m., April 12, on power plant improvements, including 375-horsepower diesel engine, with alternator, exciter, cooling equipment and switchboard. Ralph Gearhart, Cedar Rapids, Iowa, consultant.

Wyoming

CASPER, WYO.—Mountain States Power Co., W. D. Johnston, division manager, will start construction in the spring of a power substation costing $75,000.

New Mexico

ARTESIA, N. MEX.—Central Valley Electric Membership Corp., R. E. Coleman, superintendent, will soon take bids on construction of rural electric lines costing $25,000. REA has allotted funds in work.

Pacific Coast

LOS ANGELES—United States Rubber Co. has let contract for constructing a storage building estimated to cost $86,000 to W. P. Neil Co., 4814 Loma Vista street, Los Angeles. (Noted March 6.)

SAN DIEGO — San Diego Consolidated Gas & Electric Co. plans to erect and equip a three-story power plant, providing 35,000 square feet of floor space and costing $140,000.

SAN LUIS OBISPO, CALIF.—City will soon submit to voters a $50,000 bond issue to finance construction of proposed waterworks system extensions and new reservoir.

SEATTLE — Columbia Steel Co. has purchased an 8-acre site and proposes to erect a steel warehouse, involving two bays, each 76 x 415 feet. Will install considerable equipment, including overhead electric cranes, depressed track and trucking facilities.

TACOMA, WASH.—City will soon take bids on regulators, switches etc., costing $17,000, for installation in new lighting substations. C. D. Forsbeck, city engineer. (Noted Feb. 27.)

Canada

TORONTO, ONT.—C. A. Dunham Co. Ltd. has awarded contract to Austin Co. Ltd., Toronto, for constructing a 60 x 100-foot plant costing an estimated $40,000.

GASPE, QUE.—Provincial government, Quebec, has tentative plans for a hydropower development costing $1,000,000 which will supply the mining industry on Gaspe peninsula. National Electricity syndicate, Quebec, engineer.

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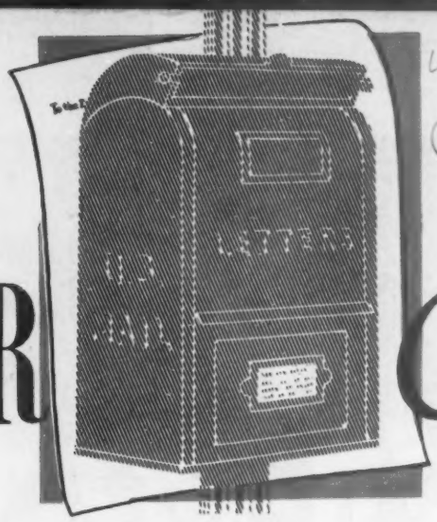

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Fabricator on Pittsburgh Plus

To the Editor:

In the March 13 issue of STEEL appeared an article regarding the "monopoly quiz" of the basing point system in which Prof. Frank A. Fetter of Princeton university was quoted as stating that "the steel fabricators have been treated as fairly as they could by anyone." It would be interesting to learn just what this statement implies and whether or not it was made as the result of an exhaustive investigation into this angle of the steel business.

Let us consider, for instance, the present predicament of the numerous fabricating shops throughout the country which were organized and grew up under the "Pittsburgh Plus" system. Many of these plants were located in small communities and their competitive position adjusted under this system, which proved entirely satisfactory.

When the federal trade commission in 1924 issued the now famous "cease and desist" order against the "Pittsburgh Plus" system and the mills established new basing points where the price was two to three dollars per ton above the price at Pittsburgh, the welfare of these shops was not seriously affected, as the variation of base prices and fabrication in transit freight privileges still permitted them to maintain their respective competitive positions.

In later years, when the mills inaugurated the delivered price system of quoting the fabricators on their requirements for each individual project, the cause of these plants was greatly encouraged, as they were then enabled to compete on an equal basis over a large area. In some cases perhaps, this did not prove profitable to the mills, although had a limit been fixed upon these operations there is no doubt it would have worked out satisfactorily to all concerned.

Last summer these concerns were dealt a crushing blow when the mills discarded the delivered price system and established another, making the base price at all producing centers identical.

Under this system the fabricator located in a small community midway between two basing points finds himself facing a hopeless situation as his competitors at the producing points enjoy a distinct freight advantage over him, he being able to compete on an equal basis only in what might be termed his own back yard.

If this situation is to prevail, there is only one result to expect and that is eventual disappearance of these independent fabricators and ultimate centralization of this industry at the steel producing centers.

Is this the aim of the federal trade commission in its recent testimony before the temporary national economic committee?

Isn't it fair to surmise that in plunging into these problems bent only upon exposing unfair practices that this body has overlooked the welfare of the many small business concerns which thrived under the old system?

This nation under the "Pittsburgh Plus" system prospered as never before and this writer agrees whole heartedly with "STEEL" in its contention that the federal trade commission should stop its nonsense and address itself to the real problem of stimulating industry.

A FABRICATOR

Corry, Pa.

Improving Employe Relations

To the Editor:

Two interesting and significant trends in modern business were accented under "Labor" in STEEL, March 27, page 21. One was the value placed on the services of older employes, evidenced by the report of B. F. Goodrich Co., Akron, O., and the presentation of service medals to veteran employes of the American Steel & Wire Co.

This trend is becoming more marked each year, not only retention of older workers because of their greater experience and steadiness, but company pride in the fact a considerable number of employes have given such long service. It is visible proof of fair treatment and good working conditions.

The other trend was illustrated by the stories on International Harvester Co., Bridgeport Brass Co. and Johns-Manville Corp. making special reports to employes on financial operations. Explanation of the sources and disposition of the company dollar in a way to make it understandable to the average employe, is becoming fairly general and tends to improve employe relations.

The Bridgeport Brass Co. report did a good job in making it clear the owners of the company were a large number of small stockholders who had risked their cash to provide a place for employes to work. A significant feature of all these reports to employes is the fact that so much greater portion of the company dollar goes to labor than to stockholders. Workers have been prone in the past to believe they were getting the short end.

HENRY HOWARD

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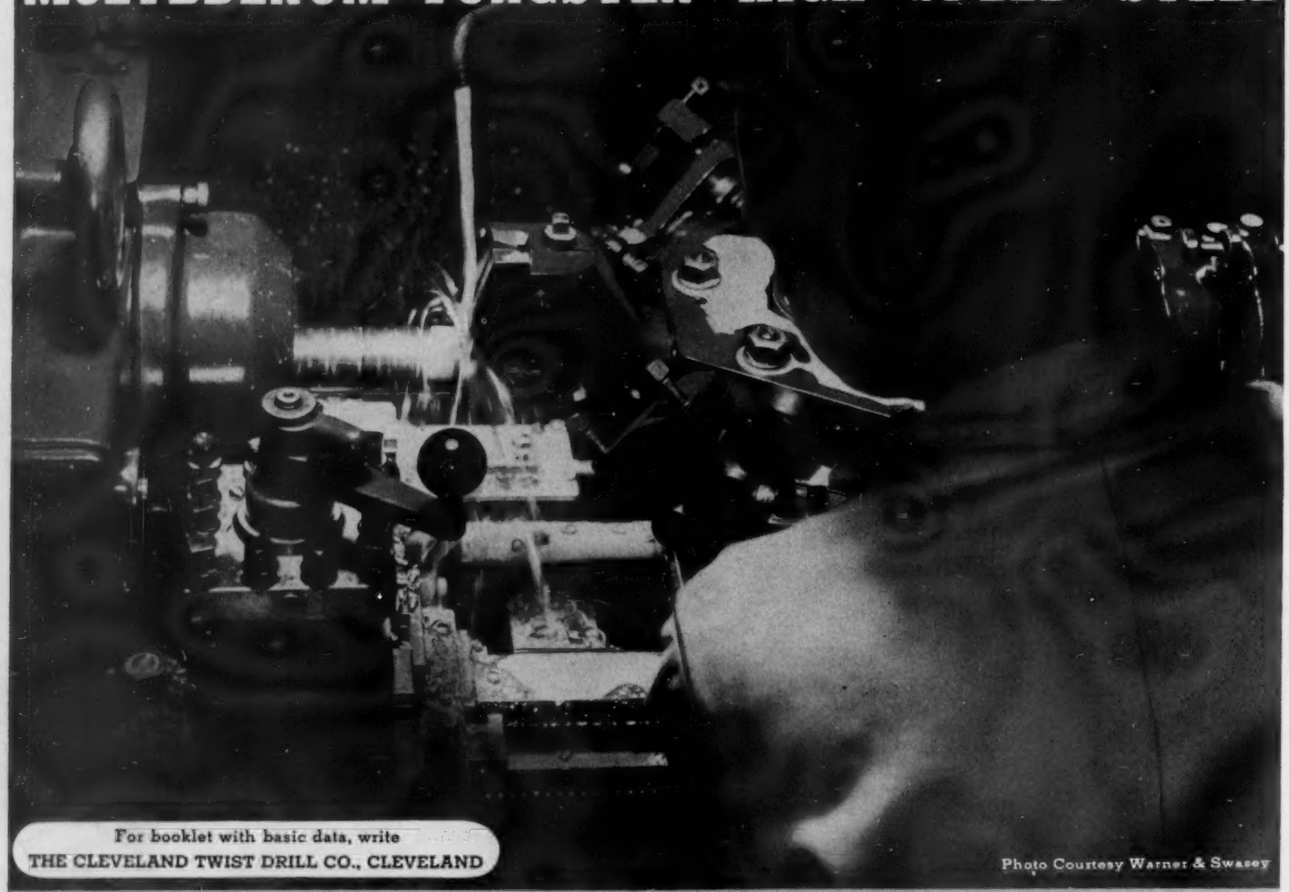

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